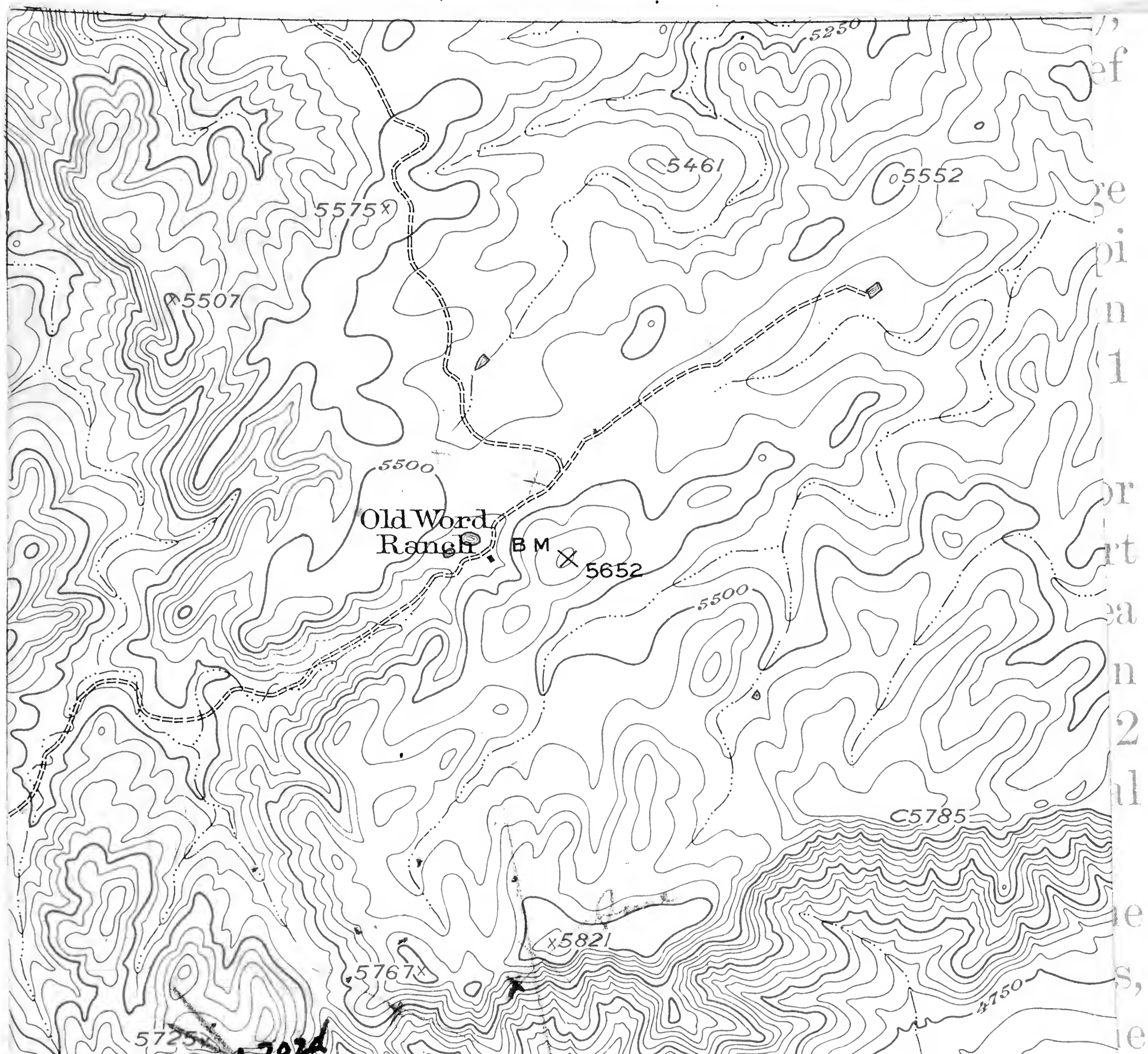
Glass Mountains

June 5 - July 6, 1950

Decie Ranch	25, 26, 32, 34
Dugout Mtn.	28
Hess Ranch	44
Hess Ranch Horst	3, 4, 6.
Hess sponge beds	44
Hill W. of Clem Mtn.	30, [redacted].
Leonard Mtn.	17, 45
Payne Hills	28
Uddenites zone	13, 22.
Wind Mill	34, 36
Wolfcamp Hills	1, 7, 9, 13, 16, 29, 33, 38, 40, 42.



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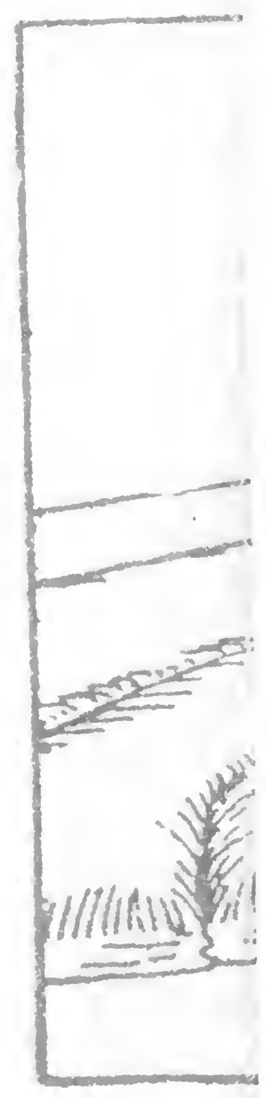
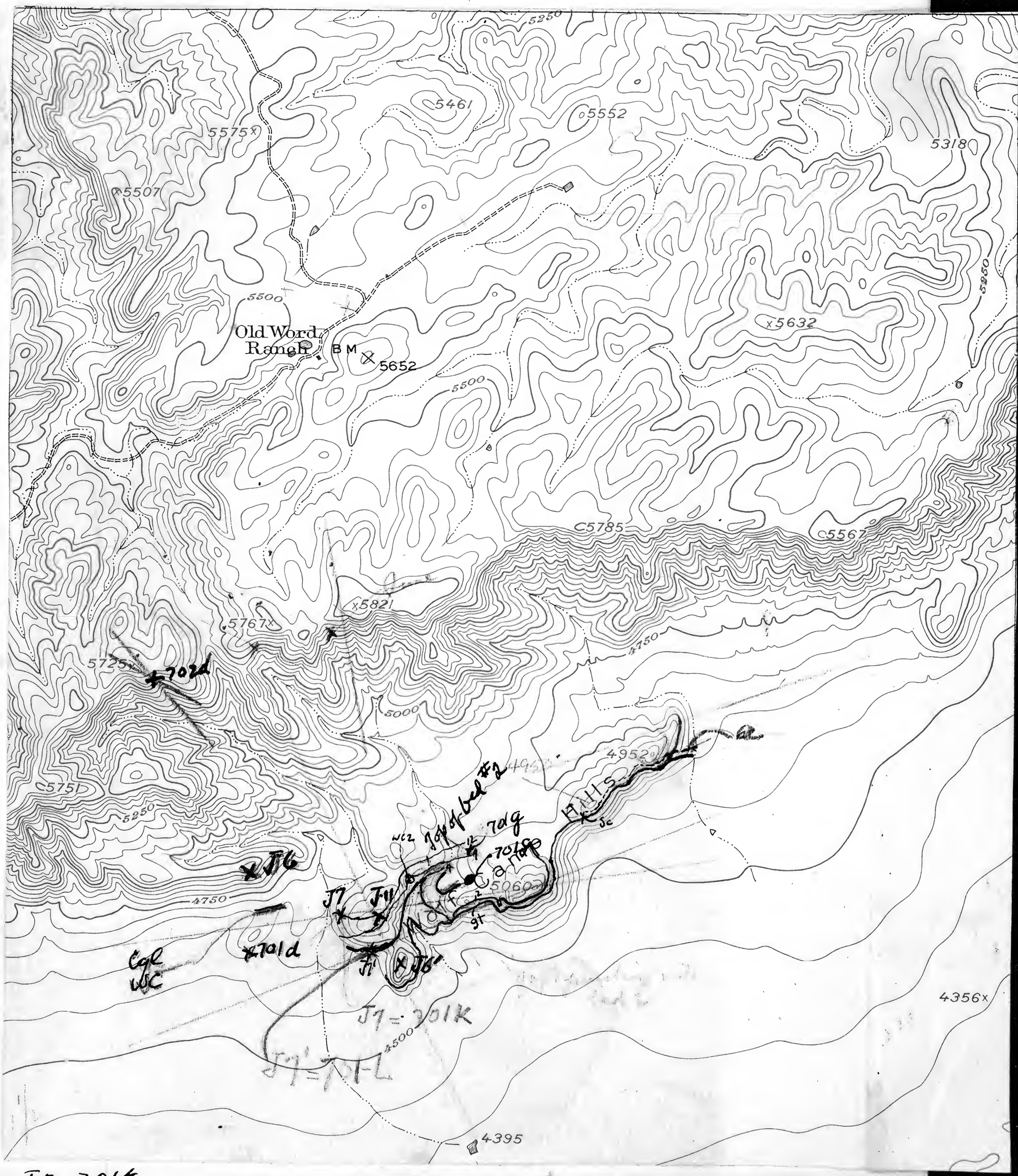


4850

J7 = 701K
J7' = 701L
J11 = ~~701e?~~ = ~~702~~ 701 l-

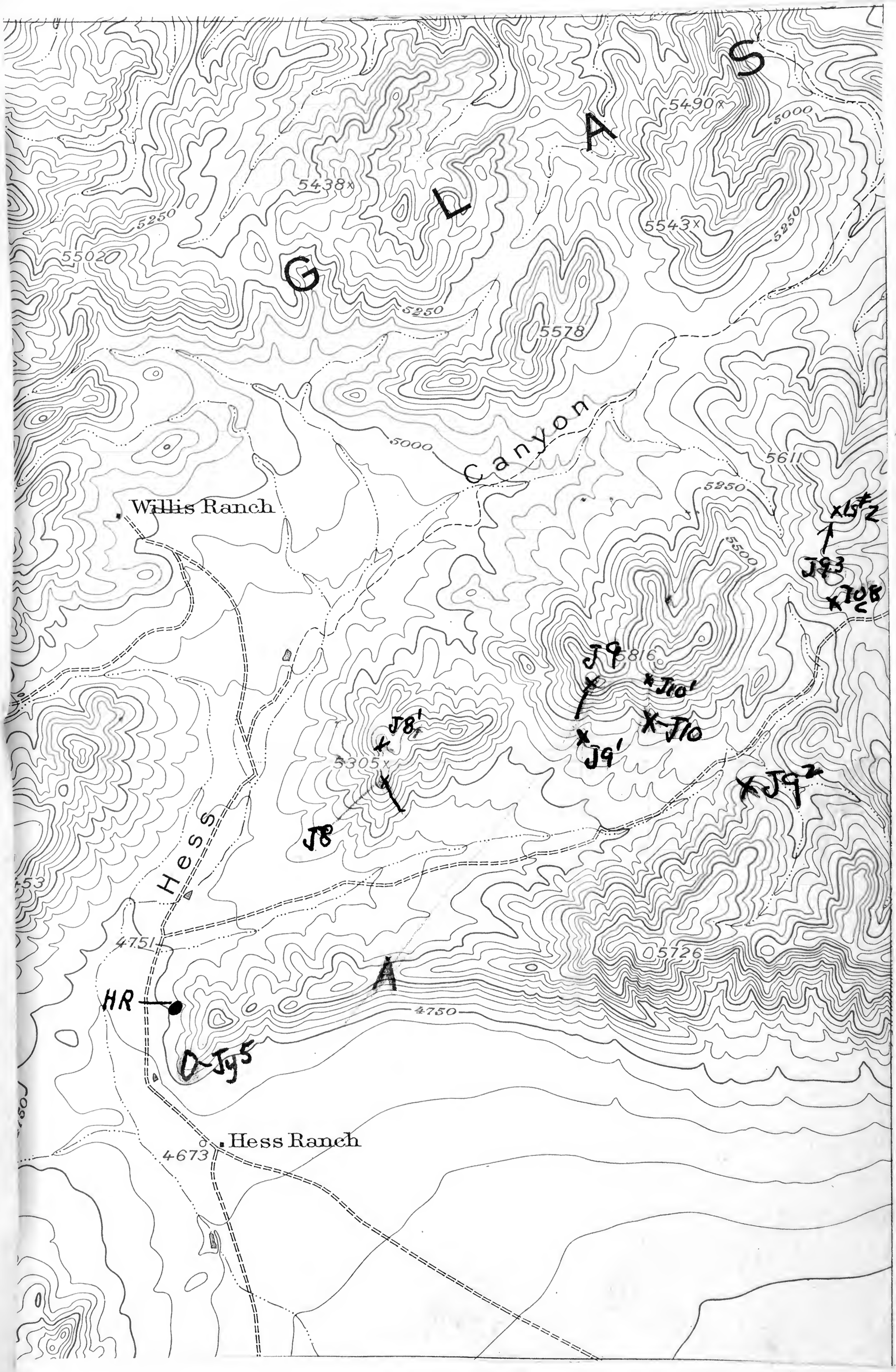
0146



JJ = 701K

JJ' = 701L

JJ1 = ~~702~~ = ~~702~~ 701h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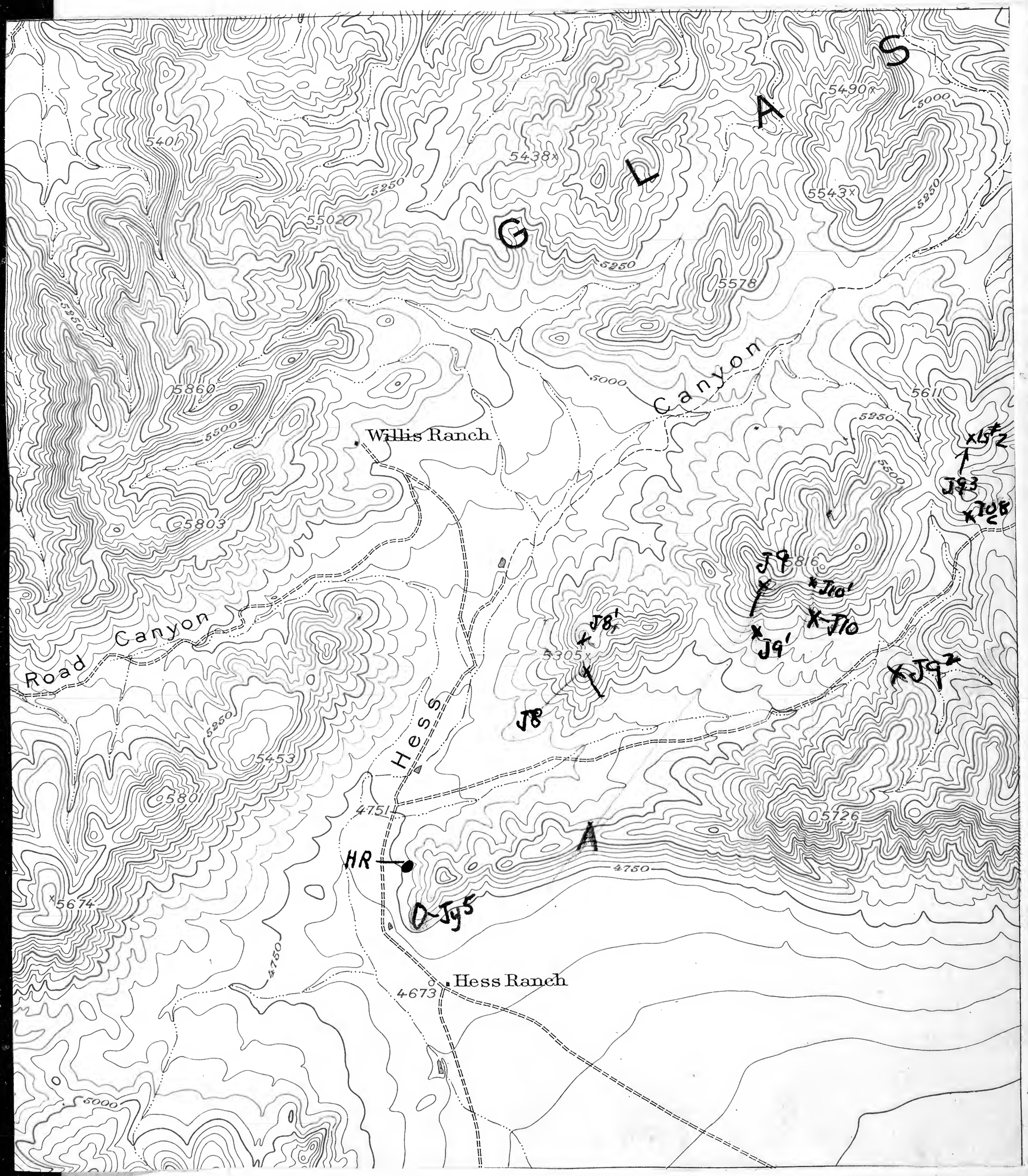
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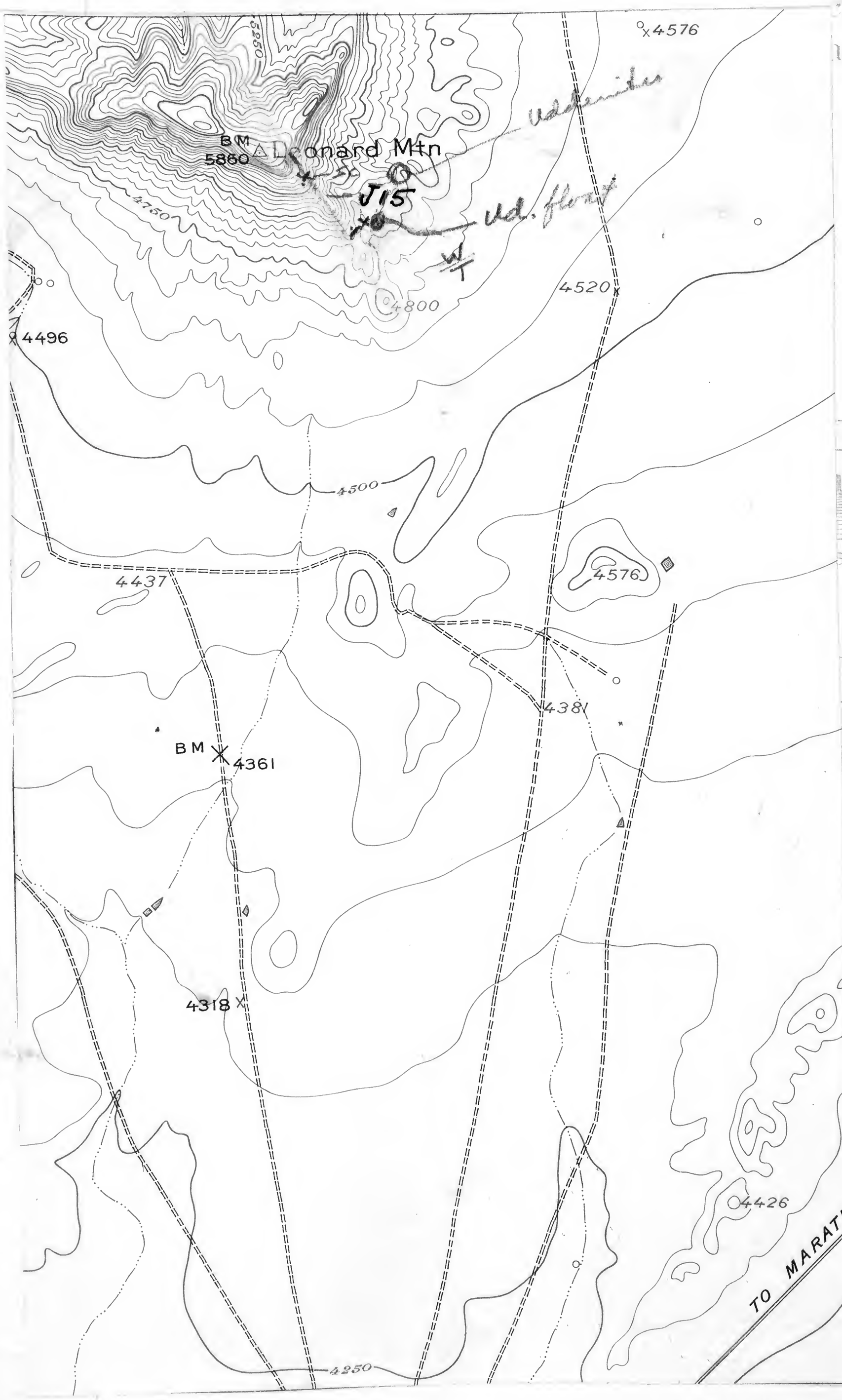
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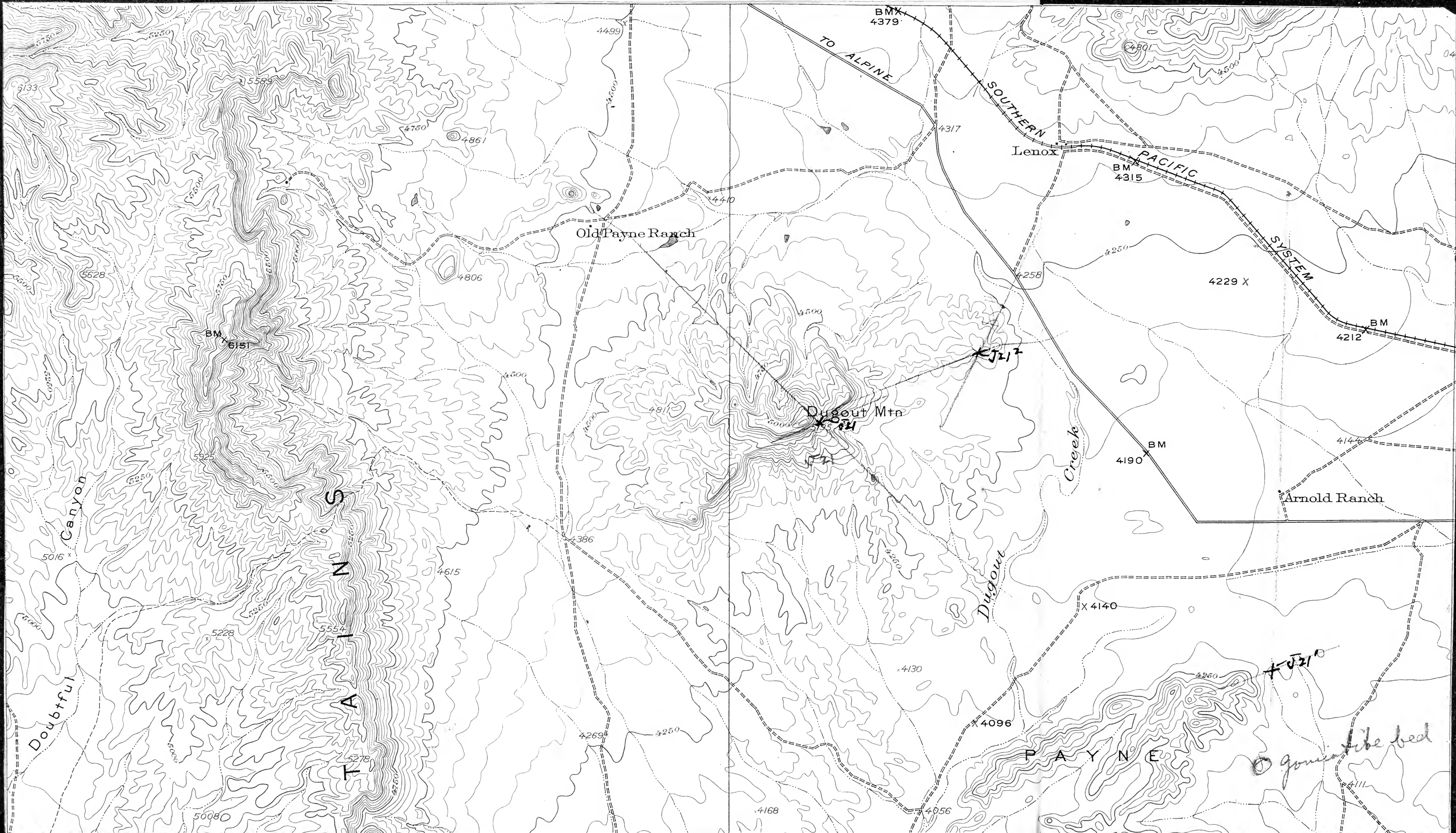
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Dugout Mtn
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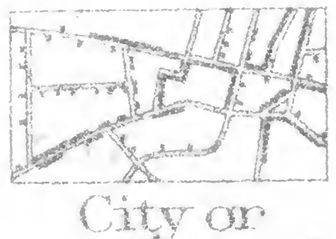
City or
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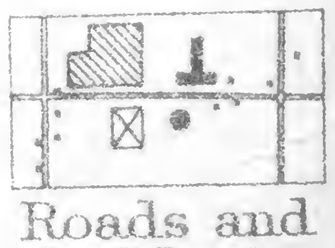
Roads and
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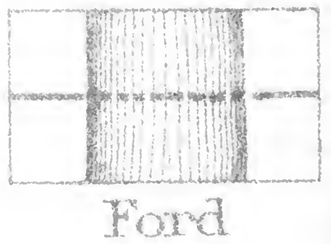
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Prospect


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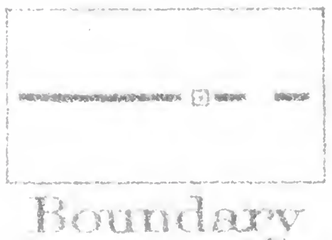
Boundary
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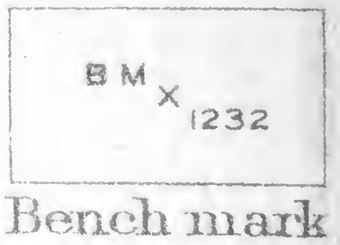

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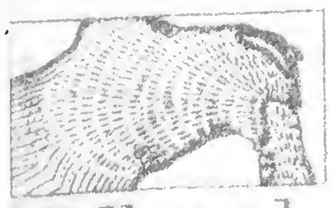
Falls and
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Intermittent
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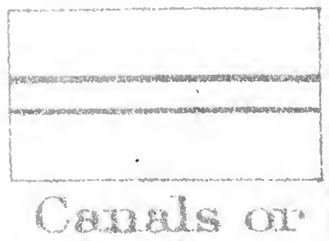
Canals or
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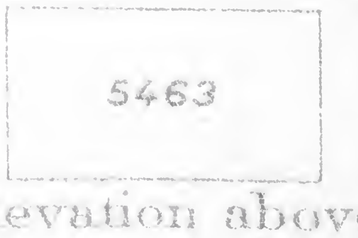

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Spring

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CATHEDRAL MTN

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Skinner Ranch

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J25

J26

J20

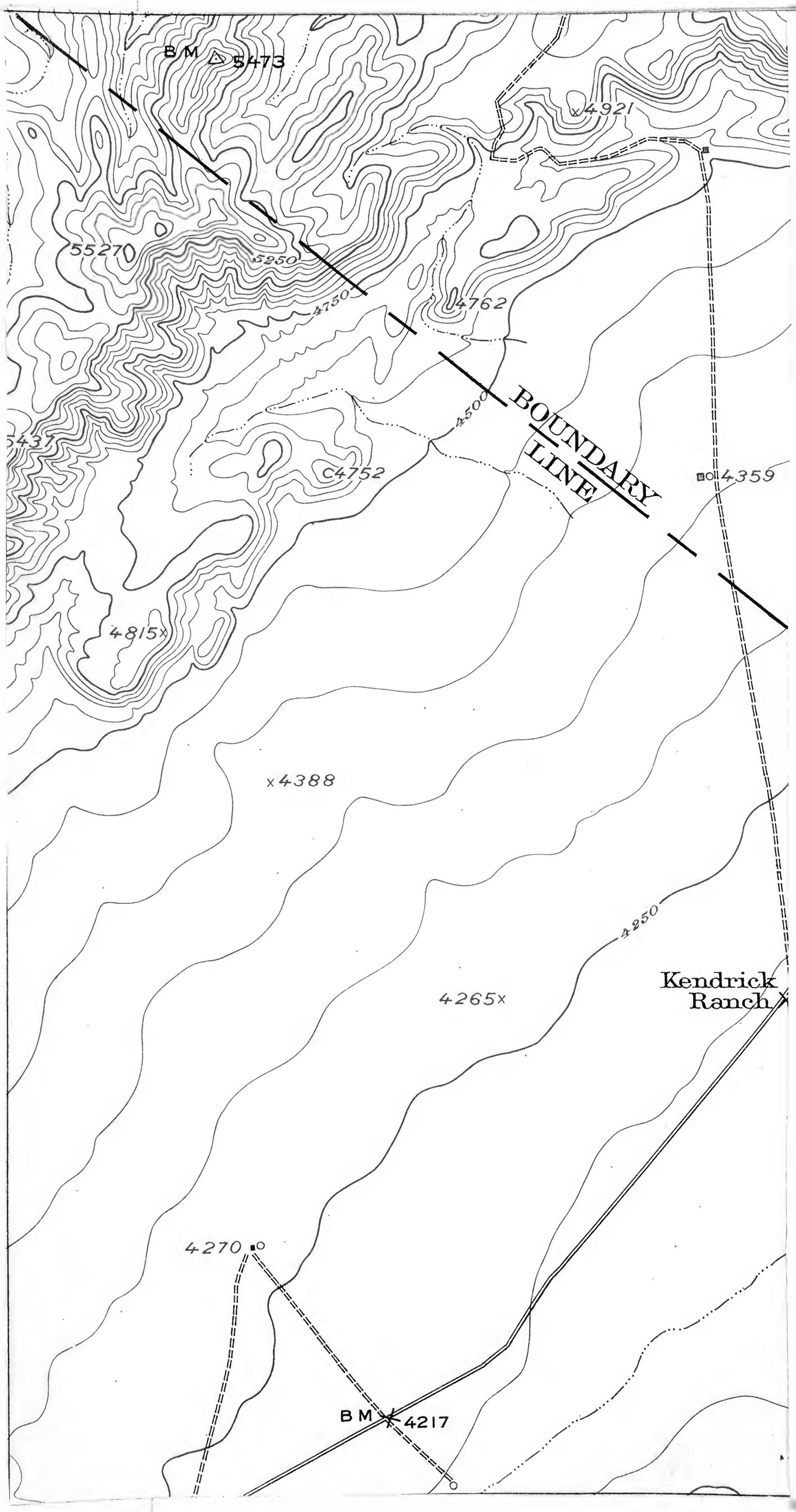
J29

Skacchimella

J18

J19

90



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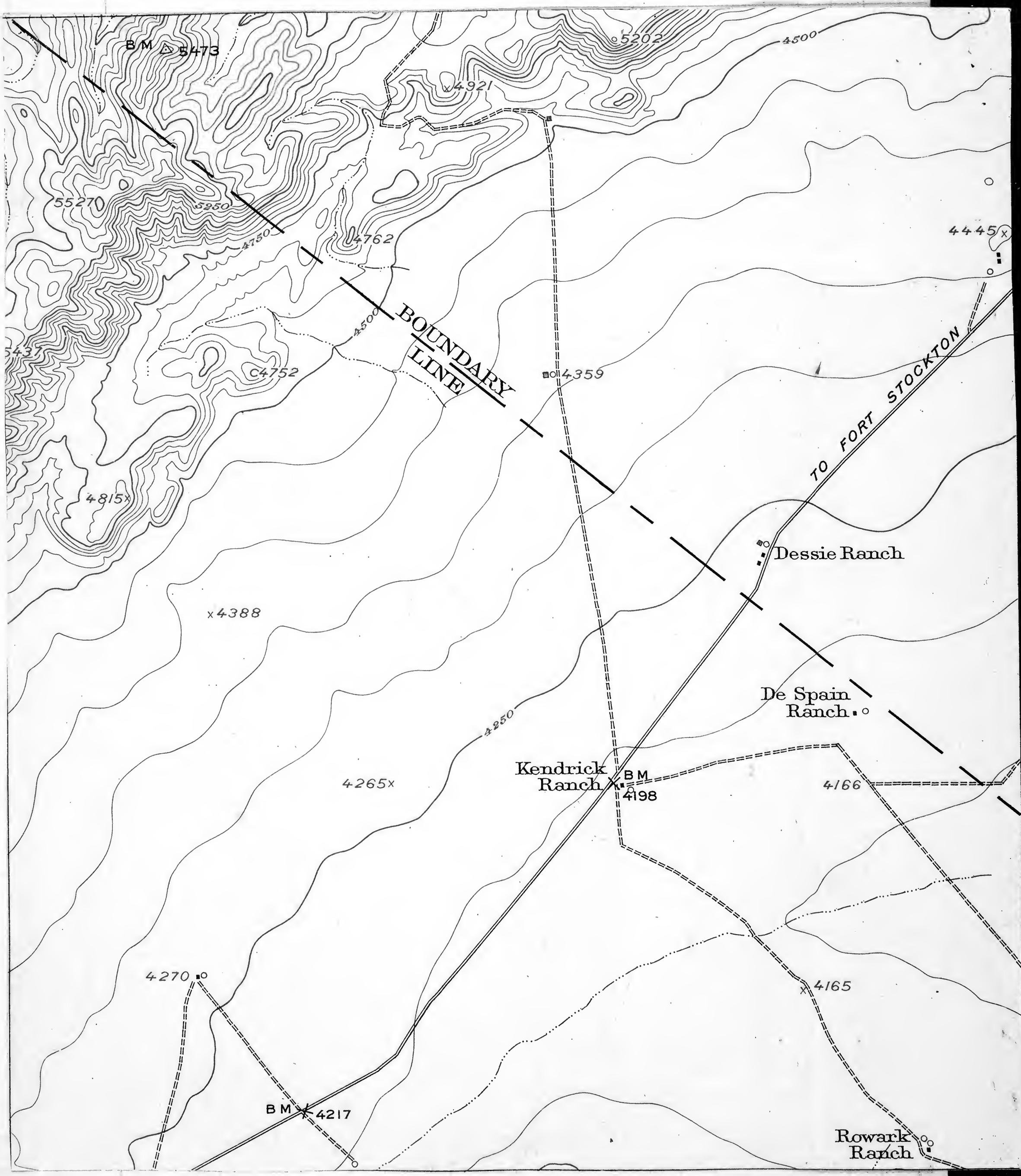
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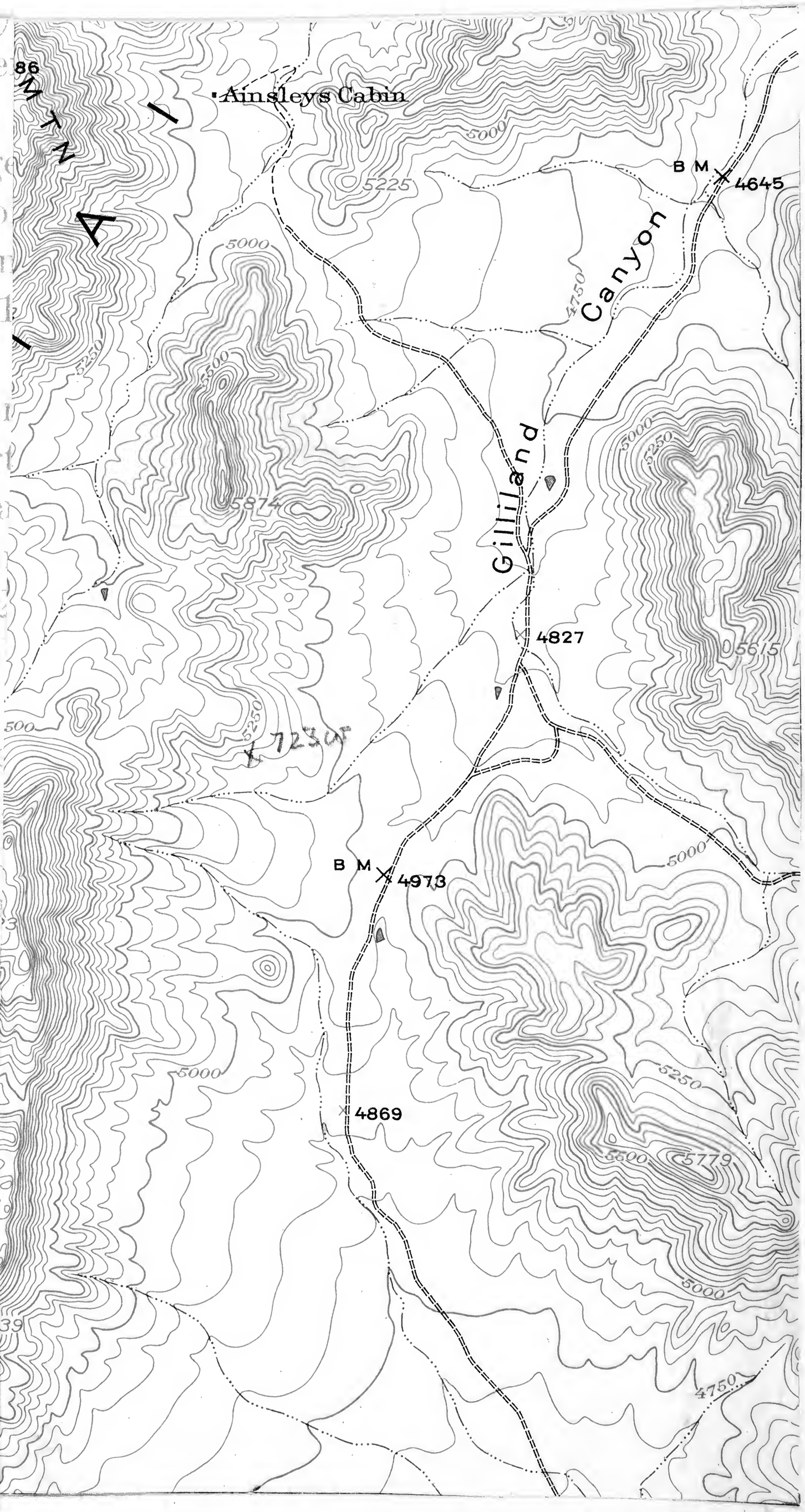

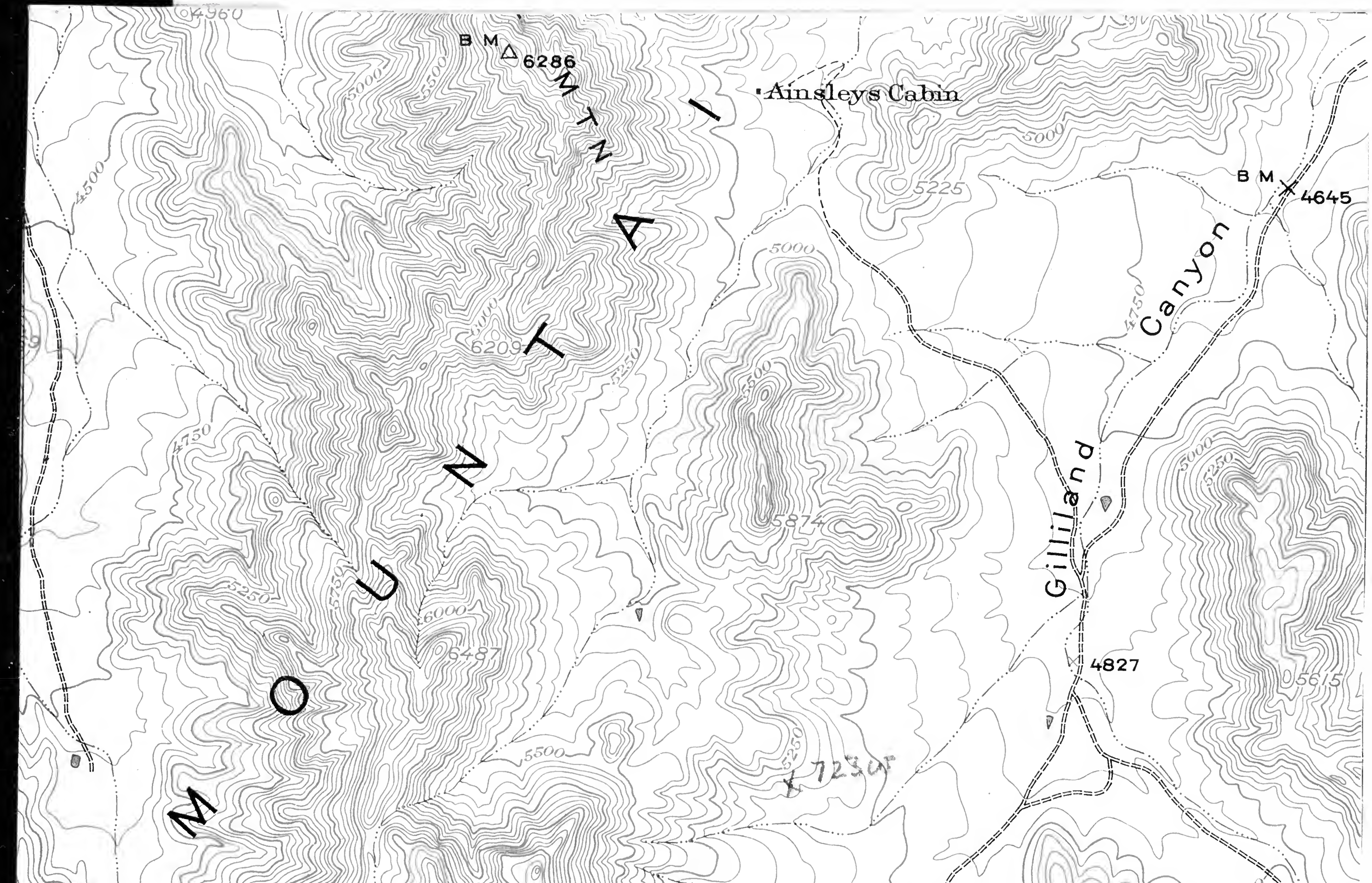
B M 6286
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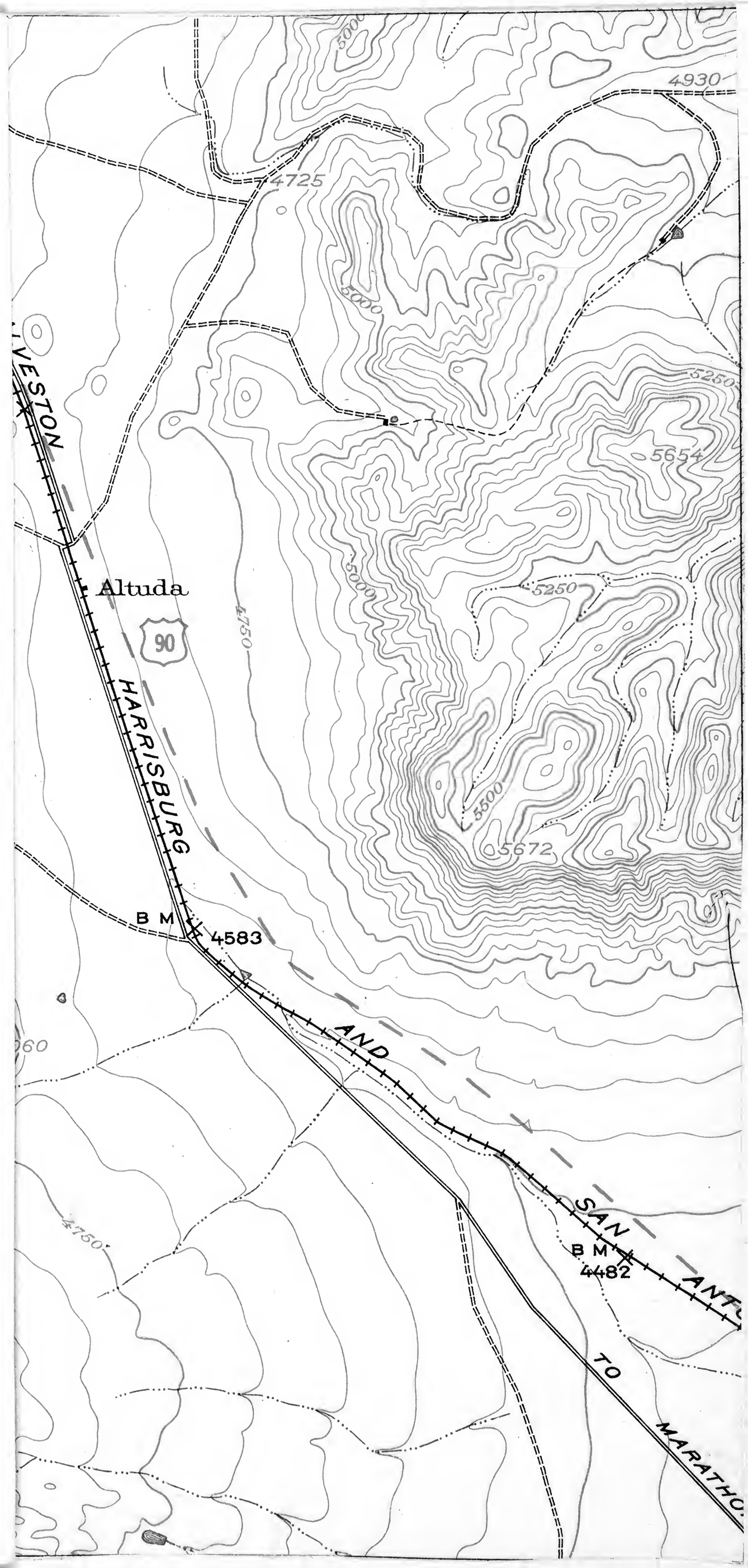
5225

April 20

Went to Iron Mtn. Ranch, took pictures of big Road Canyon Bioherm and Scacchinella bioherms on ~~west~~ east side of Leonard Mtn. Collected 9 blocks from 721 u. Had trouble with #20 ~~roll~~ picture roll of Kodachrome II. Lost several pictures. Other pictures were chiefly of cacti. Afternoon packed 2 boxes and wrapped 9 ~~10~~ blocks and a bundle. Shipped 2 boxes, 9 blocks, 1 bundle and a bundle of tools.

April 21.

Left Marathon at 8 A.M. and went as far as Brownwood where we stayed for the night. Collected on roadside 2.3 miles east of Santa Ana on U.S. 67. Check with previous measurements.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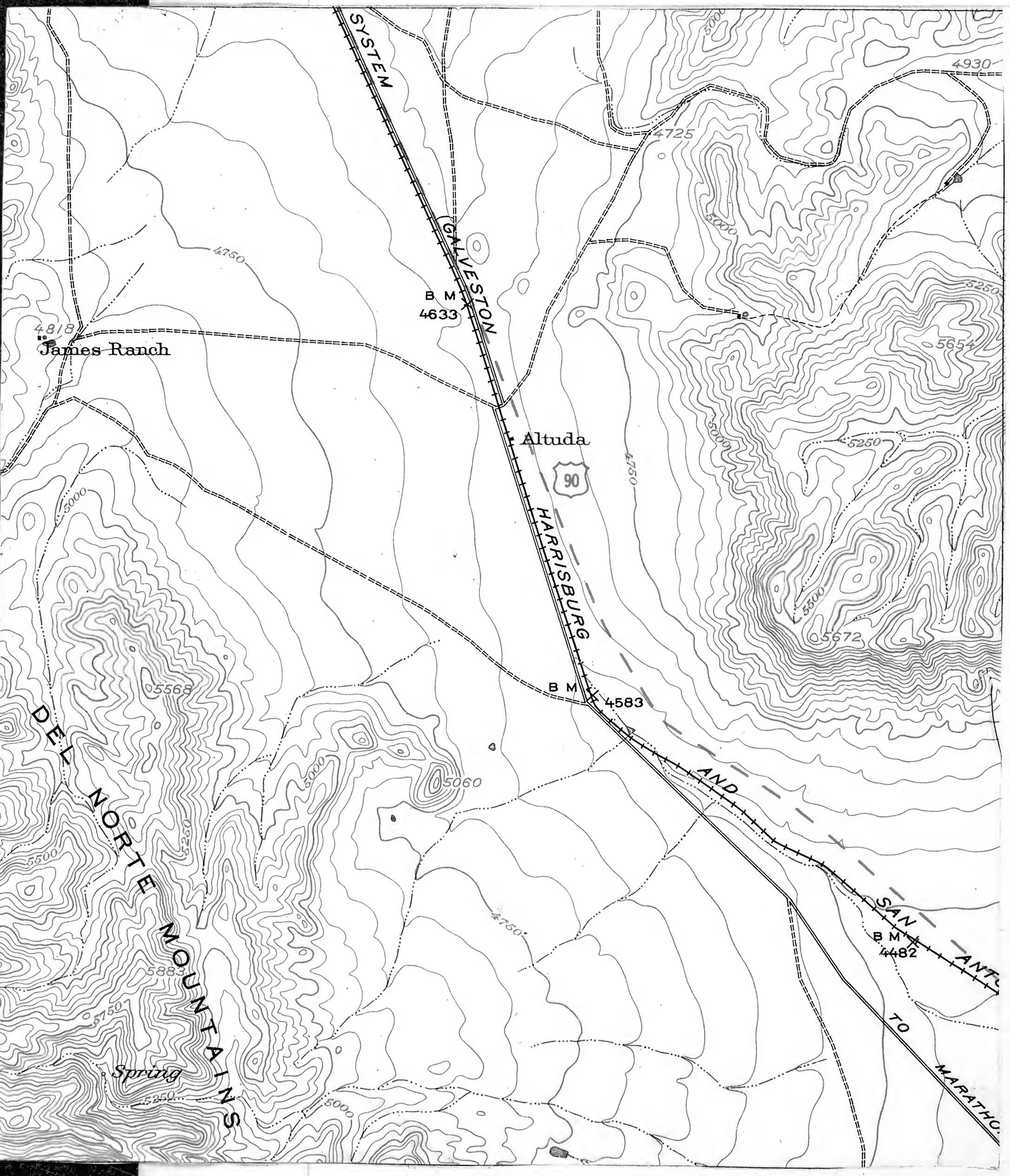
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0154

Register of blocks June 1950

~~701d~~
701 K
~~701 L~~
~~708~~
~~708C~~
~~702C~~
J-11 = 701C?
~~WC2~~
~~LM~~ = Leonard Mtn. June 15
~~WC9~~
~~701g~~
J 18 0
J 20
~~702 a~~
~~702 un~~
~~703 d~~
~~702 a~~
UD (Undecided zone canals under heavy ash)
~~HR~~
~~707e~~
J-29

One block not wrapped in burlap
702d

2
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9
16
33

19
16
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0155

(1)

June 6
Wolfcamp Hills

J6 - Fine grained heavy-bedded limestone forming thick ledge at crest of hill. At 40' below top & 55' below top occur small fusulines. About 45' below top are larger ones.

About 150' below crest of hill comes what appears to be a biotite porphyry which is about 35-40' thick. This igneous bed caps the conglomerate.

Wolcamp exposure covers about 1000' horizontal King loc. 87 = 701d west hill. Collecting here is in the lower 30 to 50 feet where there is a fair development of massive beds. Here the lowest ledge as it goes over the lower slope is massive often with large fine-stalked bryozoans and ribbon-like algae. These closely resemble the ones in the Gap tank. Brachiopods are generally not common. The massive unbedded rock is generally topped by yellow weathering limestone forming flat slabs. Sometimes the massive rock is cobbly and falls to pieces. In west hill many ledges are exposed. I think the lower beds which we collected are equal to the capping ledge on the north side of the of the canyon where King nibble bug section.

701d east Hill, This is much lower than the preceding but I think it is probably the same as the lower 50' of the west hill. All blocks taken are from the base of this hill.

Took 14 blocks from 701d

0156

(2)

J6' Went up on knob above Uddenites beds. Fossils very scarce. Rock is a massive unbedded ls except at very top where a few thin-bedded flat layers appear. Near contact of Uddenites bed and heavy ledge the rock has cup corals.

The limestones in the upper part of the Uddenites shale contain Sp. texanus and Parafusulinas.

Wolfcamp Hills June 7 = 701K

J7 East side canyon on large hill just North of Wolfcamp Point just below top of 2nd massive ledge - ledge just above King's bed 12 - possibly part of bed 12. ± 30' above top of bed 12 or lowest massive ledge. Massive fine grained containing flat bryozoans. This bed seems to be about bed 14 of King. Has big Parafusulinas.

701L = J7 Collected the massive gray limestone of King above the Uddenites locality. This bed on the N side of the saddle is about 30-40' thick, it is capped by a yellow-weathering platy limestone that crosses the upper saddle at about its middle and runs along the north canyon bank to a point beyond the small north gully. Under this yellow bed the massive gray limestone thickens and thins. The bed seems to thin to the west and at the base of the hill where it goes under the valley floor it can't be over 10' thick. Loc 701L in massive gray bed about 100 yds east of where it disappears

0157

(3)

June 8

Hill 5305 east of Hess Lake
Section about N 25° W

Come up hill on ridge just east of south nose of hill. For about half distance up hill base through medium bedded limestone conglomerate upper half is rounded limestone cobbles showing some bedding. No fossils seen other than crinoid stems. Fractures at nose of hill

18' small knob on N side of pass 18 composed of crinoidal limestone. Hole with fossils. Basal Hess. Crest of hill to east from 18 also crinoidal.

Crest from 18' for ½ mile in Hess. Defordia mud & cacalinella seen on top of long ridge and just behind it.

Conglomerate appears about 75' below the highest point of this hill. In the western part of the canyon the entire Wolfcamp appears to be conglomerate. I saw no good fossils except one coral taken loose. This looked like a Wolfcampe coral.

According to King the dolomite are east front of Hess

0158

(4)

June 9 Top of hill at 5700'
Hess Ranch Horst
Hill showing "unconformity

146' A below top ~~[illegible]~~ 704g	0' below top in steeply dipping rotted yellow sandy beds abundance of fusulines. These yellow beds underly a conglomerate band some 10' thick.
130' below top	16' above base of conglomerate A. The interval is occupied by same type of rock. The rock here has only a slight dip. Large fusulines on shaly surfaces, no good pieces seen
96' below 706j = 704S	top took another sample of fusuline.
	We took section N3° W of first knob of Hess Hill on south side of canyon. We came up through conglomerate all the way, clean to the top. About 150' below the top of the hill the beds are steeply dipping but in the upper 150' they are fairly horizontal at the surface. Our fusulines, except for the batch under Congl. A are from the nearly horizontal beds. Section is N65° W of small knob in valley N of Hess Ranch. Beds on crest somewhat dolomitized but mostly a granular limestone weathering ash gray.
702-l	J 9' - Shale in glen due N of first knob of Hess Hill + due east of east high knob of hill 5305. It is N 37° E of point A.
	Section of shale.
	C. Shale (10" bed with fusulines 3' below top) 15'
	B. granular bed with fusulines 2'
	A. Dark shale, Chonetes. ~~sponge~~ 32'

(5) Near Ranch Horst

J92 Knob showing lower Leonard with pebbles and chert stella and Entolasma. Lithology like 708. King's locality 104. Fossils not silicified.

J93 Went northwest over small hill across saddle to hill just SE of hill 5611. First low cliff is orange and conglomerate of yellow-orange shale of the Leonard. Horst type of shale continues for about half way up in the hill to the north. Ocherous Leonard or dolomitic appearing limestone occurs in the shale.

Above the yellow shale in the second hill appears 3 ledges of buff dolomite rock that contains Entolasma and a peculiar rib of magnificus. Both of these suggest the Word #2 limestone as exposed in Hess Canyon. Above these ledges appears still more yellow shale but this is paler yellow. None not below. I saw no evidence of the thin-bedded Word #1 limestone.

According to King's map Word #1 is on hill adjacent to road. I saw nothing I would call Word #1 at Word Ranch is typical. The dolomite ledges in the upper part of the hill above #1 agree with King.

708c is about 1/3 way up hill just west of divide and both of them

(6)

0160

Jayne Nesa Ranch Horst

J10 - Shale in east fork arroyo, well baked same as J9. The shale can be seen for some 70' in the arroyo, at its top living beds alternate with the shale. These thin living beds contain pebbles. Just above Mef 4 thin beds heavy masses of limestone cgl. appear and this base would be about 5225'.

7047

J 10' Top of heavy conglomerate at about 5250'. 21' above the conglomerate are shales and thin-bedded limestones containing fossils. Top of shale beds 60' vertically above base conglomerate. Then comes another massive cgl.

About 163' above 1st cgl. is the top of the second one. The rock here is thinner bedded and looks dolomitic. This may be the Mesa.

Afternoon collected blocks at 702c. Just all afternoon to get 8 blocks. Rock is mostly of clay shale on one side. Next capped by bolsomal limestone full of fossil brachiopods on east side. Layers on this side and bottoms of outcrops.

0161

Wolfcamp Hills

June 11. = 701 h

Collected knob just north of isolated knob. Here on top of hill (west knob) are biohermal masses. On the west side of the knob Pseudoleioa in common in the massive biohermal material. On the S face of the knob Auloporas and Pseudotaxis are abundant. The biohermal mass is about 3-5' thick and is overlain by flat topped yellow limestone. The dip surface on the top of the hill, on the biohermal mass is a hummocky of small knobs, some domed, possibly over biohermal lumps underneath.

Dip on 701 d = 13°.

2 biohermal masses 4' apart one composed mostly of algae. The other with branching Fistulipora.

The dip slope is dotted with small biohermal. The beds may be draped over the biohermal often leaving steep dip slopes & small basins. The dip slope looks like one bed of flat & draped over numerous small biohermal by removal of shale under limestone beds over biohermal.

A section made up the north slope just S of knob at J11 shows top of this bed to gray ls. 96' above valley floor. The mass is about 30' thick. A dip and strike on the top mass of flat bed is N25E 8° W.

From bed 2 to bed 12 the slope is 12.5°. This is made by cuff & hook.

0162

(8)

16' above top of bed 12 is another flat limestone layer. On top of this flat bed occurs the collecting place marked J-11.

Bed 2 is strongly conglomeratic at a point opposite the west end of the Vallhites knob. The pebbles are large, rounded, mostly ls. but the rock also contains broken sponges, corals, large crinoid stems and siliceous masses.

The slope above bed 2 is mostly of shale but has much cobbly rubble from the bioherml bed 12. Numerous thin yellow-brown platy limestone beds occur. Ribbon algae are common, fusulines abundant but not in place.

Bed 12 is conglomeratic, bioherml and very much like bed 2. Saw few fossils in bed 12. The upper layer of 12 is flat topped yellow brown limestone more or less sandy. Numerous broken fossils on flat upper surface. The flat beds break into blocks up to 15". Ribbon algae also common in this bed.

These heavy ledges rest on shale then have a soft cobbly base of pebbles cemented by shale and often with fossils in the cementing films of shale, then comes firm hard conglomerate and bioherml limestone. Then comes the flat beds with broken fossils. This succession is repeated many times.

(9)

June 17
Wolfcamp Hills
Maynard new section of Wolfcamp.

From a study of Kings section localities 701K and 701C must be in beds 9-12. This is the way I reasoned it out before.

Morning check on King section 24 1/3' for Uddenites seems excessive. Bed 4 forms a prominent ledge facing canyon at first elbow. Dip & strike on top of bed four at elbow is N 30° E 10-11° West. Direction of dip is N 60° W.

Bed 4 is granular, yellow brown weathering ls. This forms a ledge that runs along the N wall of the canyon near its base to the small north gully and on to the east end of the canyon. Bed 3 is almost certainly soft cobbly limestone, probably a shaly part of bed 2.

Took section from bed 4 at mouth of gully up west side small gully in center of hills N 60° W. We measured 153'-163' of dark shale with probable interbedded thin limestone. We did not see bed 6 in this part of the section although it can be readily seen facing the canyon elbow. The northeast knob of the hill on the west side of the small canyon is in top of bed 9

Section at NE knob.-

Ours section goes from bed 4 up side of hill down the dip, then we started at head of canyon bed 9. The section then went up the small hill facing the canyon.

96
30
125
251
16
5
272

(10)

B 20' Biohermal 11 } bed 10+11? 14 = 701C
D } rest cobbly 2-3' 13
A 15'-20' } bed 8-9 = 12
Shale 163'

A- bed 8, only 3' in King's section is not distinguishable here. But about bed 9 has a flat ledge on top of cobbly granular limestone. Strike on flat bed N60°E and the dip is 14°.

B, on top of the flat top of bed 9(12) is a 20' rounded mass of unbedded limestone, a ledge biohermal conglomeratic in part with Lepidocids and other good fossils. I called this & Red Canyon bed, 9 in my previous work, & think this also belongs to bed 12. 9-12 makes a fossil suite. Under the biohermal is the soft cobbly weathered

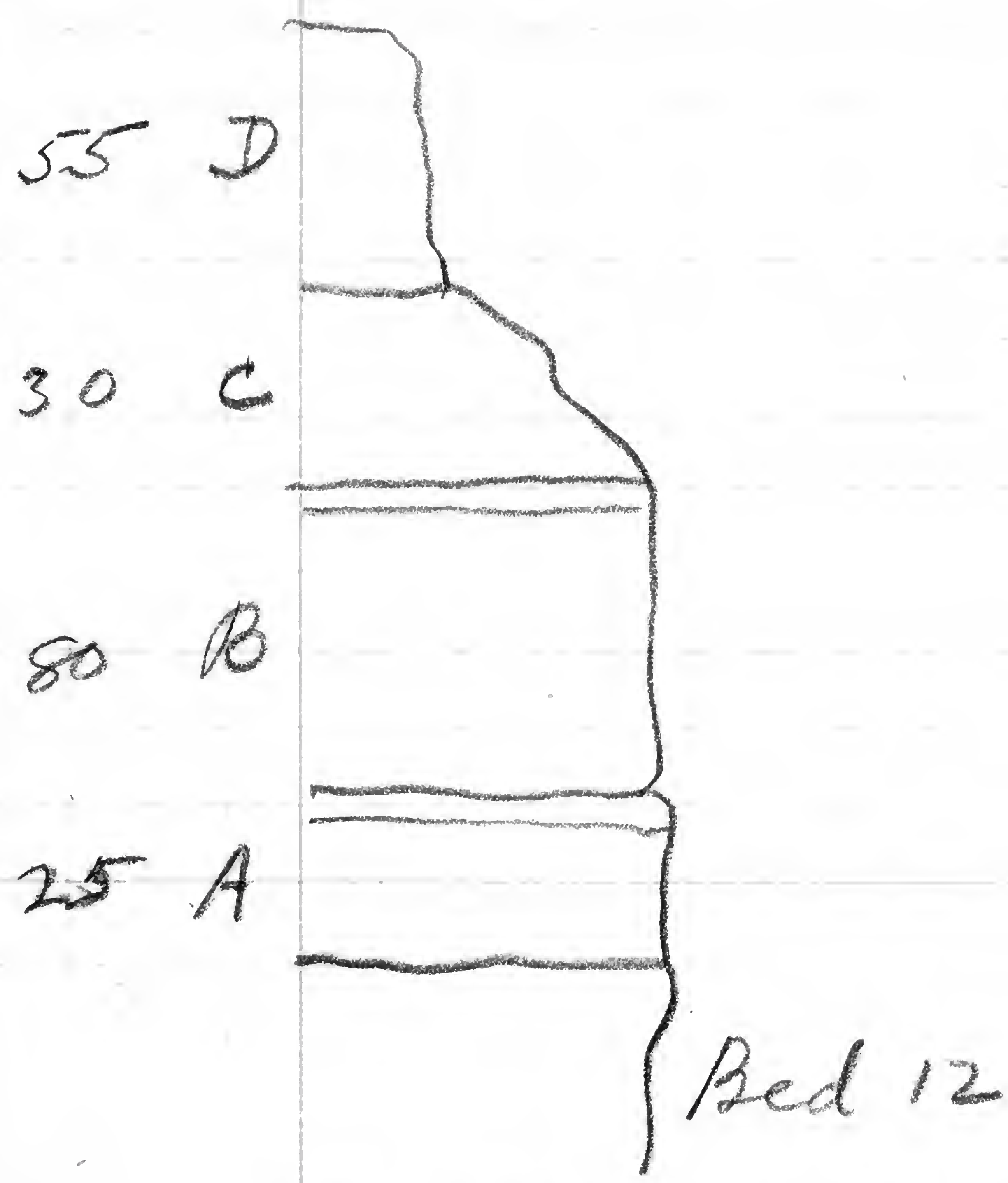
Walked east the flat part of 9. This to a platy bed only a few inches thick but then I thickens again. The biohermal mass above it thins to the canyon head. Bed 12 makes about the head of the canyon at 4700'. This condor. represents the trace of bed 12 across the head of the canyon.

(14) The biohermal has been reduced here to about 2-3' of cinoidal ls.

From top bed 9 - top bed 12, a prominent ledge is about 48'. at the canyon head on the west side is a biohermal just under the upper flat beds of 12.

(11) Interval 9-12 except for bottom crinoidal bed seems to be mostly shale.

Section above bed 12



A-25' consisting of shale becoming cobbly ls. at top and capped by a 2-3' granular ls.

B.- 80'+ of mostly shale and thin slabby brown-weathering ls. capped by conglomeratic cobbly ls. and a one foot bed granular ls. flat on top.

C- 30' of rubble covered slope with brown Wolfcamp pieces mixed with Hess cgl. I guess the section, though heavily covered to be shale and platy brown ls. ~~The last appearance of yellow pieces is at about the contours which is the Wolfcamp-Hess contact.~~

D. Probably shale 55'

(12) Base of conglomerate is 21 feet below crest of hill at about 4850'. We walked NE on bed 9 until it crosses the canyon. Lying in the floor of the canyon just at the elbow where a small canyon comes in from the SE. Bed 12 crosses the canyon about 100 paces upstream from the elbow. Bed 9 runs under the slope into the canyon which heads up to 7019'. The slope where collected is mud is in beds 9-12. This includes 7019.

Beg 4 paces under stream at about point where small canyon on west side high knob enters from the south

On Mtn front just east & adjacent to east side canyon mouth is a small knob capped by Lo. 2 of King with undenified shale below that. Below the shale is Gaptank Lo which runs NE up the slope and then flattens out to form a bowl on the Mtn. front. This is the westernmost and lowest bowl and is clearly Gaptank.

The two prominent bowl badges on the west side of the big central knob are both Gaptank which rise in a big

0167

(B)

Wolf Camp Hills

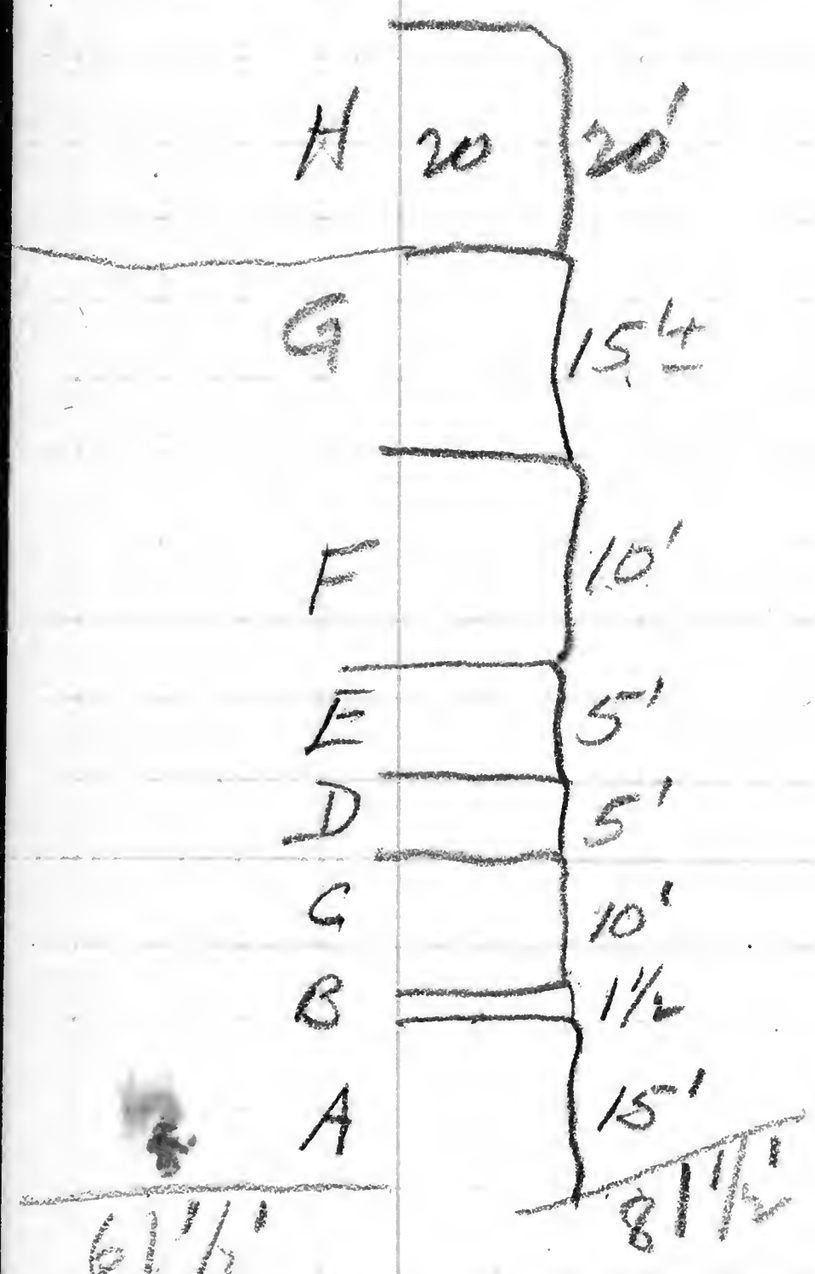
June 13.

Undivided bed in place just under o in Wolf Camp. Flat bed of Pa contour on the o in Wolf camp is a knob of the gray limestone (Bed #2 of King) Bed 2 forms a knob at O but a tongue of it extends about 50 yards NE and tapers out to the rising Gaptank bed. Furthermore the edge of bed 2 rising from the canyon tapers out to the first Gaptank ledge near the crest. The base of bed 2 comes up slope from elbow of canyon N65°W to tap on the upper surface of the Gaptank ledge, then edging out the Undivided bed on this side of the hill.

The Undivided bed appears just east of the junction point of Gaptank and Bed 2. The base of bed 2 appears about 50' above the Gaptank and just north of the crest. The maximum thickness of Undivided here can be only 30-50'. This is just about under the small knob just SE of P in Wolf. This knob is in Bed #2. The Gaptank is just about on the 4750 contour just SE of the knob

(14)

Just west of the high cut is a deep arm in the Salt Creek ledge which shows a thickening of the beds between the Duck Creek & Bed #2. The section is:



A - 15' of covered slope showing shale chips. Sequence probably shale.
B. Granular, yellow-brown-weathering limestone about 18" thick.
C - 10' inferred to be shale. Here was found a limonitic goniatite suggesting the Undenites zone.
D - about 5' cobbly beds with Reticulopora & N. texana.
E - 5' granular ls. with some fossils Parachaetetes.
F - 10' of calcareous coarse ss. steply dipping to the east.
G. 15' of shale containing gray shale from which weather brown chips resemblation of the Undenites bed.

$$
\begin{array}{r}
277 \\
\times\ 135 \\
\hline
1385 \\
831 \\
277 \\
\hline
37395
\end{array}
$$

0169

(15) H–20' or more forming a tongue of bed 2 overlying the mass. This makes a narrow point. The sag in the Gaptank amounts to about 75'. The Gaptank seems to cross the high front at about between 4800 & 4900' contours.

In afternoon before storm collected on east side of Knob J6'. Here the Gaptank is 92' above the floor of the valley. The upper Uddenites yields the limonitized goniatites and Uddenites. Yellow limy beds near the middle are like the yellow N. texanus bed & os. in the Sag on the west side of the high Crest.

0170

(16)

June 14

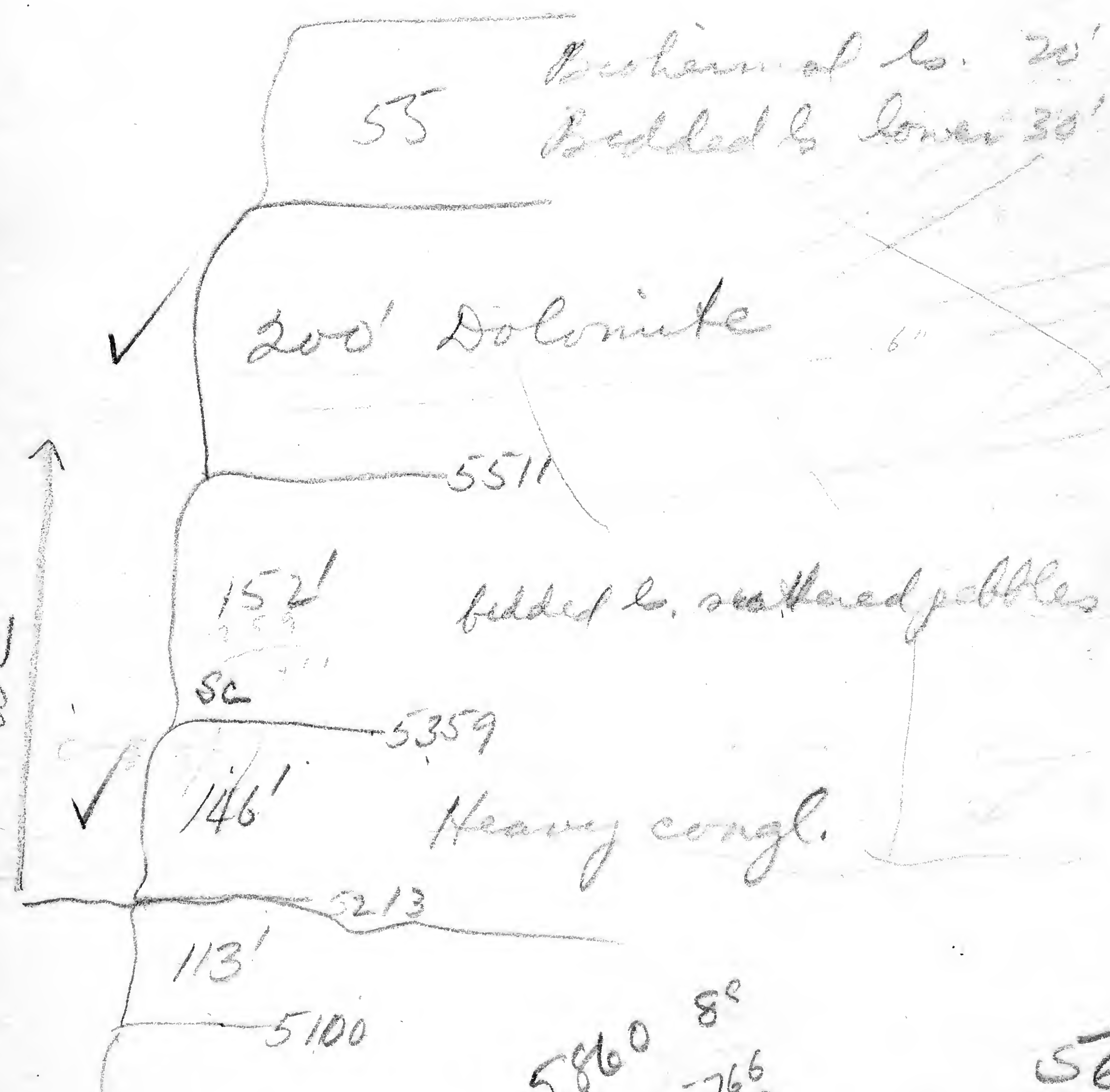
High crest on west side is made up of a large imbedded mass. But Reddish Limestone appears down the slope to the west and laps onto imbedded rock just N of Mellenge ag in the Bayfield

Yellow Weathered Zone around to east face of high crest The base of which is at about 7900' Along the front NE of the high crest the Bayfield becomes a double ledge or the Weathered pinkish upper Niagara limestone. On each side of the crest the reef must be 75' to 100' thick.

Leonard Mtn

634

407



666
5100
5766

5860 8°

58

5766
4750
1016

563

(17)

0171 1

Leonard Mtn.
June 15

Went up SE point of Leonard Mtn.
Wolfcamp massive limestone occurs throughout and on the nose of the hill. Top of nose is at 5100'. The nose contains much conglomerate throughout and at its base.

At 113' above level of knob or at 5213' comes a very massive ledge of conglomerate.

At 146' above 5213' or at 5359' comes the end of the coarse conglomerate. Here comes coarse granular ls. having a dolomitic appearance. It contains scattered pebbles of small size.

20' above gl. are dolomite & Leonardinella

At 152 above 5359' or at 5511' comes end of granular limestone which is followed by dolomite.

At 200' above 5511 or at 5711 comes bedded light gray ls. Below this had some massive brownish gray dolomite which forms the chief bluff. The gully up which we went is in exact line with the three low bluffs at the base of the mtn about N35°W.

The next 55' to 5766 bring us to the top of the mtn. at this point. These 55' are in granular & crinoidal limestone with a large bioherma[l] mass at edge of mtn. This is all lower Leonard of King.

The top of the mtn is 75' higher making a total elevation by H.G. of 5841'. I am thus 19' out.

At the head of the ravine is a large bioherm[al] in which D. gratiosus is common. This is probably a Hess Bioherm. To the east under it is thick-bedded Hess type ls.

(18) The bioherm is about 20' thick and composed of smooth gray ls. in which bryozoans and algae (ribbon) are abundant. Occasional brachiopods occur. Surrounding the bioherm is a crinoid and fusuline sand. West along the crest of the hill the same fossiliferous ls occurs for a short distance. The very top of the Mtn. is in platy, thick-bedded ls of East-Hess type.

On base of tongue shale goes up to about 4850'. Top of a thick conglomerate is on about the 5000' contour. 20' above this was seen Aulosteges wolfcampensis and fusulinids. ~~The~~ From this fossil bed up to top of tongue are massive limestones.

The 4900' knob is composed of coarse cgl. with big brown boulders containing spicules.

15-20' above the 146' conglomerate comes reefy unbedded and crinoidal rock with Scacchinella and other fossils.

(19) Leonard Mtn section

	Richmond Is. - Upper part Hess	30'
	Bedded gray limestone	20'
	Massive dolomite	200'
WC	Bedded granules Is. scattered pebbles & cochliella about 15'-20' above base	152'
	Conglomerate, large Is pebbles.	146'
Z	Heavy bedded Is. few pebbles Fusulines and Aulostegia wolfcampensis	213'
= Gaptank = Wolfcamp	Conglomerate	150'
	shale	100'±
		1011'

From edge of Mtn at 5766 ½ strat at 4750
= 1016'

(28)

Wolfcamp Hills (Cont'd)
June 16.

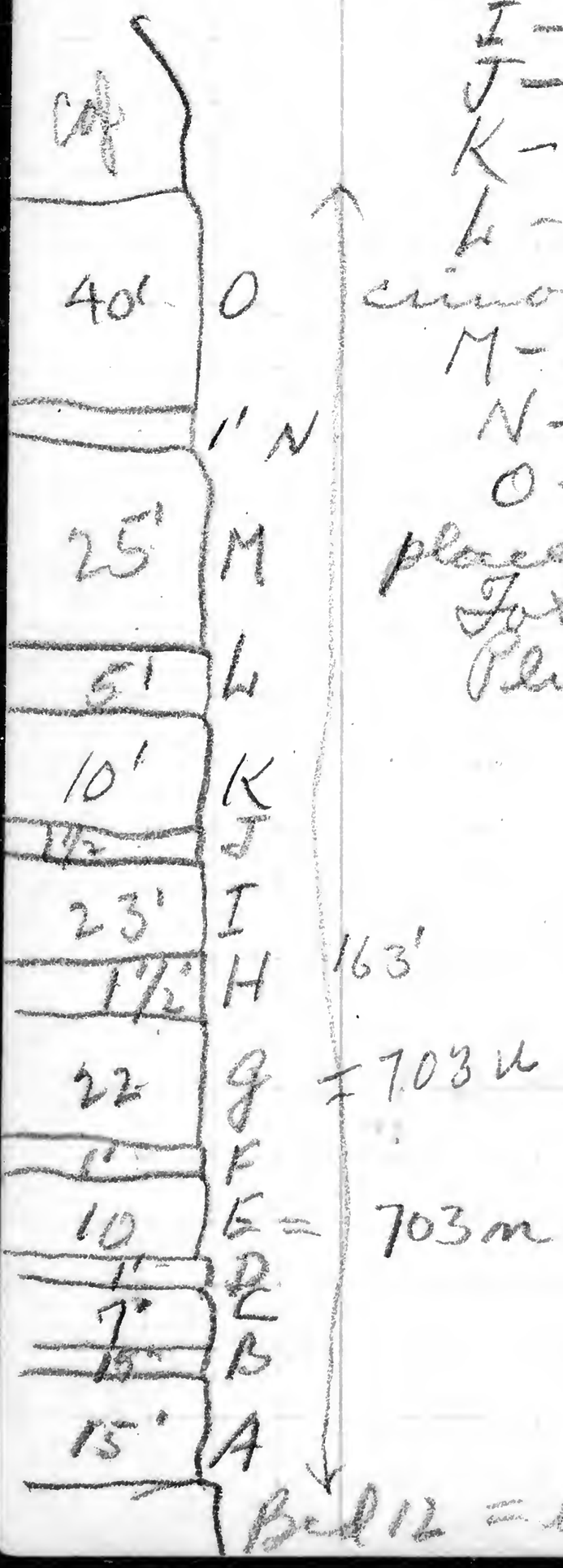
The flat surface of bed 9 forms the dip slope of small canyon from south at head of canyon. Beds 1, 2 is in stream 165' up from junction of N & S canyons

Section above bed 12 parallel to north canyon Strike N 63° E 8° NW

A - 15' shale
B - 18" hard fine grained ls. flat top
C - shale 7'
D - hard yellow ls. 6" - 1' thick
E shale 10'
F hard yellow ls. up to 1'
G - 22' shale
H - hard ls. 1½'
I - shale 23'
J - 1½ hard granular yellow ls.
K - 10' shale
L - 5' biohermal lump with large crinoid stems. Flat platy bed on top.
M - 25' shale
N - 9" - 1' hard yellow ls.
O - 40' covered to conglomerate in place.

Total thickness A - O = 124'
Plus covered = shale ? 40
164'

Bed 9-12 (12-14) 66
230
Shale bet 5-8 163
Bed 4 5
Bed 3 10
Bed 2 50
458'



(21)

Across the saddle between the high crest and the next higher hill to the east the surface is dotted with bioherms ls often composed of algae. At the east end of the saddle the bioherm bed is 10-20'. Parafusulina occurs in the biohermal beds.

Up the slope just under knob east of high crest 65' of shale from Gaptank to base of thick ls. Then comes 32' of heavy massive ls and then an interval of shale occupying a horizontal distance of 40-50'. Then comes thick ls again which is bed 2 I am not sure, probably the latter.

Sh-10-15'
ls 32'
25' sh
10' cobbly ls
sh 30
Gapt.

Found Scacchinella about 6' above top of Gaptank in cobbly beds at base of 30' biohermal ledge just under fence at west end cliff. The thick biohermal mass is just on the west bluff facing the high crest occupies a sag in the Gaptank because the latter rises conspicuously at least a contour just under the knob.

The uppermost ls 50' back from edge ls nearly white fine grained and quite clearly bed 2.

On west edge of hill Uddenites bed 30' above base is mostly cobbly ls. at least 10' thick with Parafusulina & fusulines.

1243

4950
10
4880
4900

0176

(22)

Wolf Camp Hills June 17 = 702 n,o

Section about 3/16 mile SW of hill 4952, the gap between the hills of the Gaptank ledge is 40' below the crest of the hill or at about 4810'. Just about it is a band of brown algal-biolmal ls. The anticlinal amplitude of the lower brown ledge is 21' thick and then there is about 17' of slope covered with cobbles weathered out of the slope. Here we found Scaphinella and Parafusilina.

Hand level section under main hill between high crest + hill 4952

Top of hill

5'	massive limestone (See note) = bed #2
16'	Thin bedded limestone forming a ledge on top of hill
20'	Cobble covered slide slope
32'	Biolmoid brown, algal ls., weathering yellow rusty, large fusulinids.
	Gaptank gray ls.

Note - Between the 16' and 5' beds are 52' occupied by shale which does not appear in the vertical section. Use regional dip and profile for true thickness. Under high part here Gaptank ledge is at 4880'. at other end of this hill Gaptank ledge is 80' below top or at 4820'.

horizontal

4852
132
4517

25
5
125
10
135

(23) About 20' above the top bench ledge in the Wahweap zone outcrop large lying open heads.

West nose of hill 4952 brown ledge of 21' thick. Slope & cobble slope 20' to brown bed under upper Wahweap ss. Upper ss. capping hill is 15' thick. Saptank at about 4850'. Baseline was taken from the lower part of the brown beds just under the upper Wahweap layer. Starting at the west end of the small hill this upper layer descends to about 4814'.

The upper Wahweap bed thickens somewhat as it descends. The small knob at the west end seems to be an enormous thickening of bed 2. The thickened mass forming the small knob is 135' thick. The rock on the west side of the knob is dolomitized. This mass seems definitely to be bed 2. This bed is dense limestone-like. The mass rests directly on the upper bed of the Wahweap sandstone cutting out the thin upper shale.

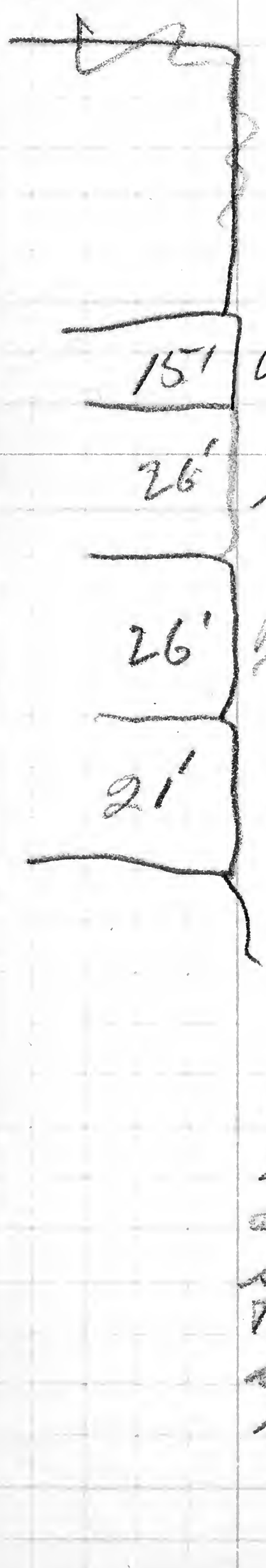
The dip on bed # 2 on the middle high ledge is 11°. This will serve as a good regional dip.

4817
88
4729

0178

(24)

Hand-levelled slope on west side of knoll at east end Wolfcamp Hills. Hiss shows 88' of section and puts the Gaptank at about 4729'



15' Upper Udden beds.

26' Slope mostly covered by boulders + cobbles.

26' Brown massive conglomeratic ls. Same as lower Udden layer at base Udden

21' 21' slope mostly covered but top in at least 5' of brown ls.

Gaptank

Just under west side of hill 4950 about 150 yds west of knoll the Gaptank Bay rises immediately and runs up down the Uddenites succession. On the east side of the Gaptank lumps the ground as appears. The section is thus thickened by at least 20'.

(25)

Decie Ranch

June 18

Leptodus bioherm occupies crest of small hill. Rests in sandstone cgl. with many quartz pebbles.

The Hess ledge should be described as a conglomerate. It can be separated from Wolfcamp only by its fossils. The conglomerates cover and surround the Scacchinella mounds. Exotic blocks as much as 15" in one direction were seen. In places pebble accumulations are very dense just like the quartz pebble layers in the Wolfcamp.

420
116
314

Leonard Hills from.

June 19

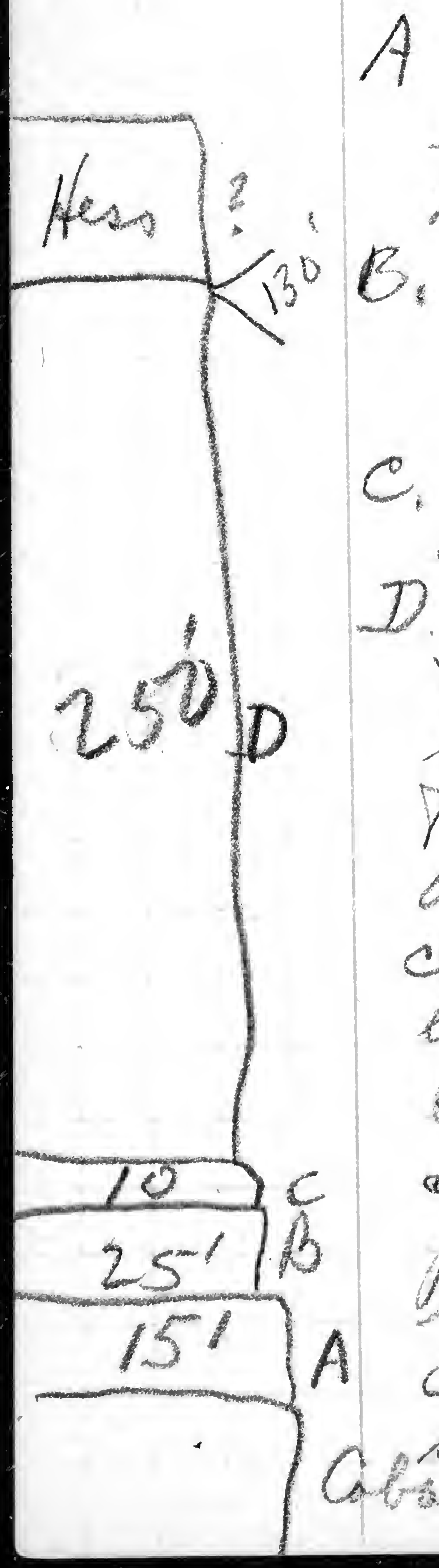
Section started at 4550' goes west.
Decie Ranch

A – 15' massive ls cgl. with ls. and silicious brown pebbles, both large

B. Strike N 50° E 9° W.
25' thinner bedded ls. cgl., mostly small pebbles

C. 10' biohermal bed with flat algae, and Silizophora

D. I have 250' of section all in cgl to base of hill 4900 W. To probable base of Hess is 380'. This entire thickness is in conglomerate of large pebbles + small pebbles. I could see no line of contact between Hess + Wolfcamp the former being as conglomerate as the latter. In the main, massive Hess ledge pebbles are more scattered than below. Possibly the massive character of the bluff sets it off. The slope under the bluff is mostly covered



Dip on Hess ledge 12°.

(26)

The top of the Hess must be at about 4800-4825' Beds of brown Leonard-like shale occur below Scacchinella just E of T19.

June 20

Spur W of Sullivans Ranch Road

Base of hill and for about 200 yards south from hill are exposures of Wolfcamp consisting of ledges running parallel to the hill. Under platy or siliceous thin beds are thick layers of bioclastic ls. This ls. looks exactly like the strongly conglomeratic Hess from the center of the hills west. Furthermore there are bryozoan and algal reefs like those of the Wolfcamp and the Hess.

Up the slope the ledges continue but many of them have Leonard-type yellow platy shale under them. The Wolfcamp here is not so strongly conglomeratic as farther west.

The ledge mapped as Hess at this end of the hills is almost completely without pebbles. The limestone is quite pure and its structureless character reminds me of the thick ledge in Leonard Mtn.

Fossils seen in the bioclastic lime suggest those in the Hess ledge farther west. We saw large Camarophoria venusta, large Wellerella, Aulosteges and what appears to be Scacchinella. The latter was seen in at least 3 levels up the hill but I was unable to collect them. Scacchinella is abundant in a ledge near the base of that hill about N 3° W of poplar tank.

(27) The possibility should not be overlooked that the small fault at this place has a greater down-throw than that of the Leachinella bed at the base of hill containing Goyerella also, in replete with ammonites and also contains large Heteroceras and Wellerella. This also strongly and conspicuously conglomeratic Hess border beds have most like the Hess cliff in the western part of the mountain where it is very conglomeratic. On the other hand No ledge mapped as Hess in the spur extending from the range has only a few scattered pebbles and is suggestive of King's No 1 of the Lowland. This bed mapped as Hess also contain Leachinella.

Dugout Mtn

(28) June 21

climbed front of Dugout Mountain to King's ammonoid ledge. We found few ammonoids or other fossils. Basal Hess carries [illegible]

J21² walked over faulted block of Hess-Wolfcamp to east of J21. Wolfcamp shortly thickbedded cgl. often quantity. Hess contact taken where first fossil lenses appear.

J21¹ about 1¼ miles due south of Arnold Ranch at head of large arroyo are beds of Gaptank. At the base of one exposure is a heavy massive bioherm composed of corals, sponges & reefy brachiopods. Here I took the Permian genera Anlostoges and Scacchinella. This

700g bioherm is just like those seen in the Uddenites zone and the Wolfcamp. It also had considerable flat algae. This is a definite Pennsylvanian bioherm but the reefy elements are Permian types.

(29)

June 23

Went to Split Tank, Searched again for bed of peculiar brachiopods without success. Visited 703d the Spirifer ledge at the base of the Word. Went out to 702e for most of the afternoon.

June 24

Went out to Mountain front opposite Wolfcamp Hill in morning, took up Leurchinella beds at Hess Ranch in afternoon

5553
4700
5253

(30)

0184

Hill West of Iron Mountain
June 25

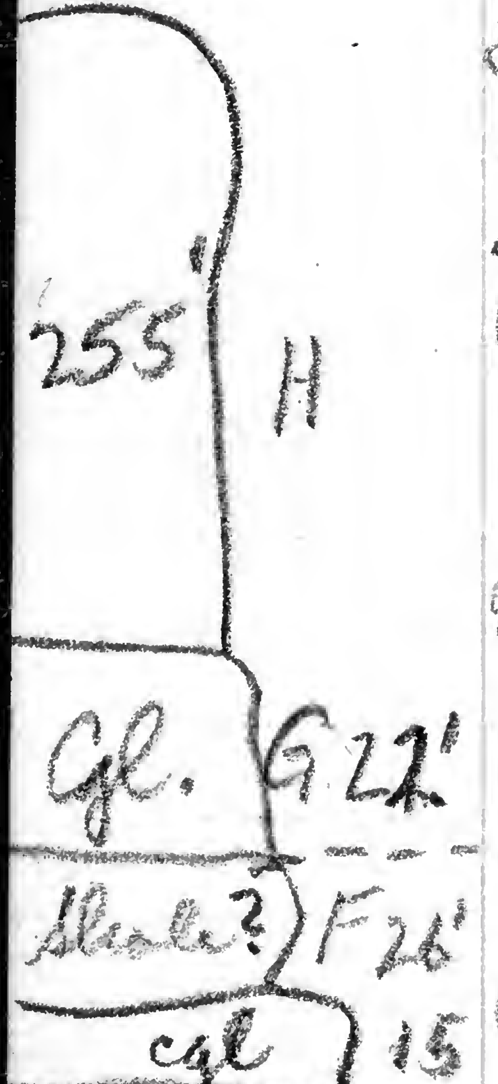
N 30° W
Went up spur S 70° E of house
on west side Iron Mtn. Lower 75' of
spur in sandy beds that suggest
the Tesnus. At any rate the material
looks like that under the Wolfcamp
on Leonard Mtn. The spur at about
4700' is capped by 10' of Wolfcamp
limestone cgl. Mostly with small
rounded ls pebbles but also small
quartz pebbles. Went up Mtn about N 70° W

Strike N 30° E Dip 12°

Above the pebble bed the next 135'
are covered. Then comes massive
unbedded ls. This continues for 40'
vertical when the slope is again
covered. The next 60' are covered

G-H = Hess

but then comes a massive cgl.
probably the beginning of the Hess.
The covered slope seems to be in
shale. Here are nodules with flat
algae similar to those in the
Wolfcamp. On top of this covered
shale interval comes a thick cgl.
probably the base of the Hess. This
would be at approximately 4950'
The shaly slope at E is followed
by 15'. Then comes another shale?
slope for about 26'. This is
followed by conglomerate with
large rounded and ragged
pebbles up to 8". Many are ls.
but most of them are
rounded, some are
siliceous. This cgl is 27'
thick. This is followed
by the massive ledge
of the Leonard which is
granular ls. The top of bed G
has fossils, particularly large



E
60' D
40' C
135' B
Cgl. 10-15' A

476

5250

0185

(31)

crinoid stems. The two upper conglomerates are most suggestive of the basal Hess cgl. of the Dixie area.

It is 255' to the top of the hill in the granulea Leonard all the way. At about 40' above the base is a conglomeratic band but above this the pebbles are generally scattered. The section we came through is 553' making 5253 to top of knob on N side of saddle.

Resembles Leonard #1

The top of the knob is mostly ls. which has scattered small pebbles. The very top is a thin cherty layer followed by yellow shale. It looks like the Leonard on the Dixie Ranch. Here occurs King's Marginifera reticulata the same as at Leonard Mtn.

About 100' below the summit or at about 5150 were found Scacchinella in smooth ls. This is over 150' above the Hess conglomerates and is in conformity with the upper beds of Scacchinella on the spur just south of Sullivan Peak. We saw no Scacchinella in the conglomerates, either the upper one or the lower one.

0186

(32) Dove Ranch June 26

Visited spur just south of Sullivan Peak. Found the picking rather poor.

J26 Went up hill above spur on east side of Lemix Hills. Up the slope massive Leonard type of rock is first encountered to about the level of the spur. Above this comes the yellow platy shale, visible in the slopes in places. This is followed by a massive ledge of granular limestone, brownish gray forming a bluff of considerable height.

At the base of the ls. of the Leonard which forms the big bluff occurs large crinoid stems, patches of eff and Scacchinella.

50' above the base of the ledge occurs a siliceous band with numerous Marginifera reticulata.

85' above the base the rock becomes bioherm near the top of the hill. Here we found Scacchinella fairly common at 85'. The top of the bioherm is at about 105' above base. The base of the thick ledge is at about 5030'. The 20' above the bioherm is moderately bedded gray ls. which may wrap around the bioherm with the bioherm top forming the top of the hill.

A long dip slope on this band extends north and dips under a knob composed of yellow shaly material and thin quartzite beds.

33

June 22

Back to the Wolfcamp Hills.
Collected blocks from upper 15' of Bed # 7 at the mouth of the small gully to the south. The dip slope of bed # 2 contains many small lenses of massive ls representing either numerous depressions or many bumps and a very irregular surface. The one collected is a very large one and is overlain by bed # 4 at the mouth of the gully.

560

4600
130
92
55
108
4985

4950

0188

(34)

Windmill Hill

June 29   707W-Y

Section up nose of hill just east of Sypher, Davis Ranch.

A – Brown cgl quartz pebbles densely matted.

B – Massive gray ls., scattered pebbles big crinoid stems. Scacchinella is abundant in the upper part. (bags)

C. – Thinner bedded gray ls mostly covered

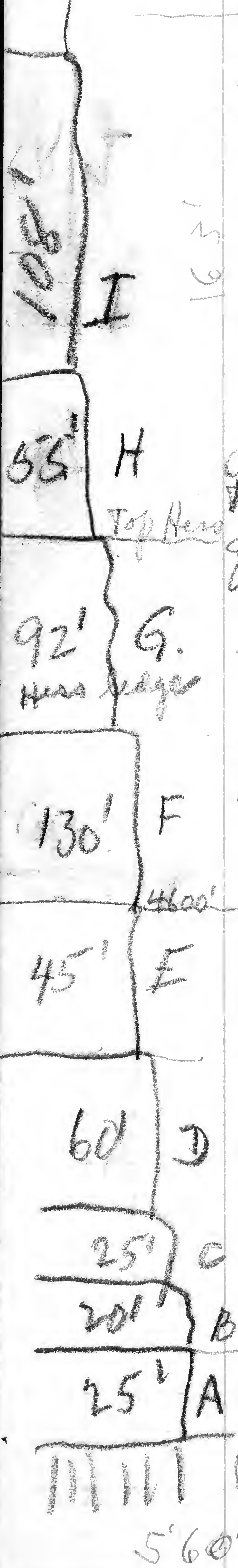
D. – 60' massive gray finely granular ls. This brings us to a small flat on the nose.

E – 45' of massive conglomeratic limestone with numerous cup corals. This brings the section to the base of the Mfn. The pebbles are mostly small quartz & jasper & quartzite. The top of this bed is at about 4600. [illegible] lots large Composita. These lower beds definitely correspond to the lower ones with Scacchinella just to the west. Sponges numerous. = Hess ledge

From the top of cgl E. I reverted to the hand level. 20' up slope comes yellow thin-bedded limestone and green, hard shale of the Penn. This is dipping about S30°E. This could be a fault block and there may be shale between the cgl & the slope.

F – covered 130'

G – Massive ledge forming a bluff in hillside at about 4830'. At 26' up we found Scacchinella and Geyerella. This is the level of my 1947 collection =707X



4950
560
4390

35

G - The Hess ledge is 92' thick massive conglomeratic ls. but upper part less conglomeratic than lower half.

H - covered slope to base of high bluff capping knob of hill. 55'

I - 108' to top of Mtn. all through massive conglomeratic and granular ls. Scacchinella taken at
713 m 70'. Strike on top N 73°E 10° NW.
On slope facing long dip slope of Hess which I measured are ½ yellow shale at base, ½ limestone like that of the Hess at top. King calls this Leonard ls. #1. Top of ls I measured is at base of shale. The shale is about 75-100' thick and the ls about 75-90'. This shale may correspond to the shale capping ls #1 ledge on the hill to the west.

0190

(36)

July 1

Windmill Hill

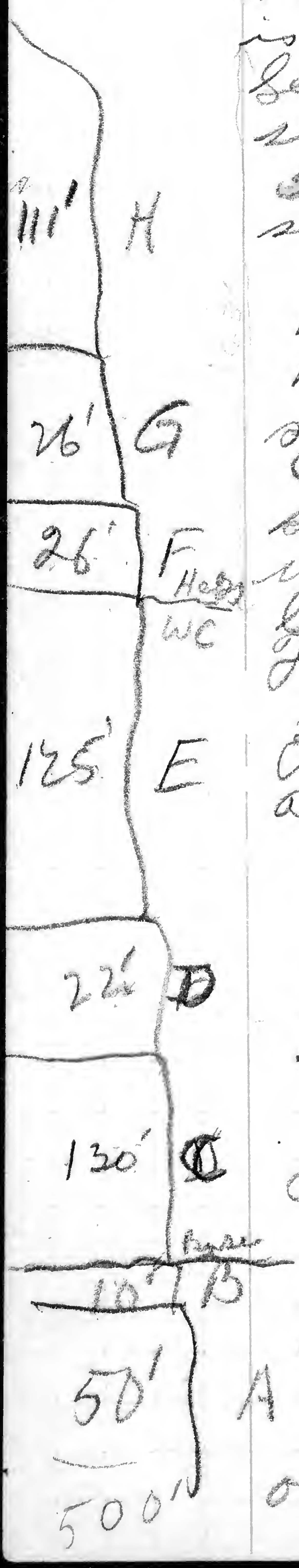
Pack 1

1,2 Spur & Decie Hill

3,4 " " "

Section N30°W through middle Knob at 5000'. Section starts on the closely packed cgl. which is exposed for about 5' vertical. Section handlevelled. Section starts on 4500' contour

50' up or at 4550 is a slight dip slope. On top Scacchinella common



A - 50' massive ls. Scacchinella

B - greenish gray sandy indurated sh.

C. 130' to a small break in slope, mostly massive ls. with occasional quartz cgl. The last qtz cgl. seen near top of interval. This would be at 4680'

D. 22' bedded ls some cogl. This brings to base of Mtn at about 4700'. Small ledge of [illegible]

E - Lower part covered but upper part in about 50' of Hard cgl. The base of the Hess ledge is at about 337' up or at 4837' contour.

F - Hess ledge here 26' thick contains Scacchinella all through.

G - 26' of slope of yellowish Leonard type shale, with regional dip. May = 35-40'

H - heavy-bedded ls. to top of hill or about 111'.

0191

37 To the east beds F + H come together, pinching out the shale in that direction. 55' of shale slope in J29

Bed E which corresponds to my covered interval of July 29 contains at least 40-50' of coarse cgl. This may = the heavy cgl. under the Hess on the Mt. west of Dugout Mtn. We ran our section through the saddle where I collected in 1947. Probably Wolfcamp contact should go to base of Hess ledge which would give 337' of Wolfcamp. The cgl. is at least 60-70' thick

Pack 1,

5, 6 looking N at Hess ledge and saddle, hill east of Sullivan Ranch road.

I think the Wolfcamp-Hess boundary comes at the top of the conglomerate in E.

(28)

July 2

Pack I
7-12 Wolfcamp.
Pack II
1-2 West end Wolfcamp Hills

On the east side of the canyon mouth the Uddenites zone almost pinches out on the top of the Gaptank. This may not be unconformity but may be thickening of the Gaptank as bioherms because the first prominent Gaptank ledge appears at this thickening. Furthermore Bed #2 is thin over this portion. Bed #2 is thick near the Uddenites bed at this point but thins to the east, to thicken again in the high crest.

Bed 2 overlaps onto the Gaptank on the NW side of the Gaptank ledge and about on its crest.

On the very crest of this Gaptank ledge the Uddenites zone the part with the Goniatites fauly is exposed. Here bed 2 forms a hump about 100' north of the cliff edge of Gaptank.

Upper surface of Gaptank contains rusty nodules.

The upper rusty brown layer on the N side of the crest is virtually in the goniatite zone. The limonite float is abundant above the brown ledge which first appears on the N side of crest of the second Gaptank mound. Here also just N of the 2nd crest is a biohermal ...

(39) that grows up from the bright brown ledge. The Producend is somewhat cobbly mottled brown gray Ls. This lump is about 8' high! Tyulifira. This may correspond to the upper ledge under bed #2 on the East side of the Mtns.

(10)

July 3 Wolfcamp Hills

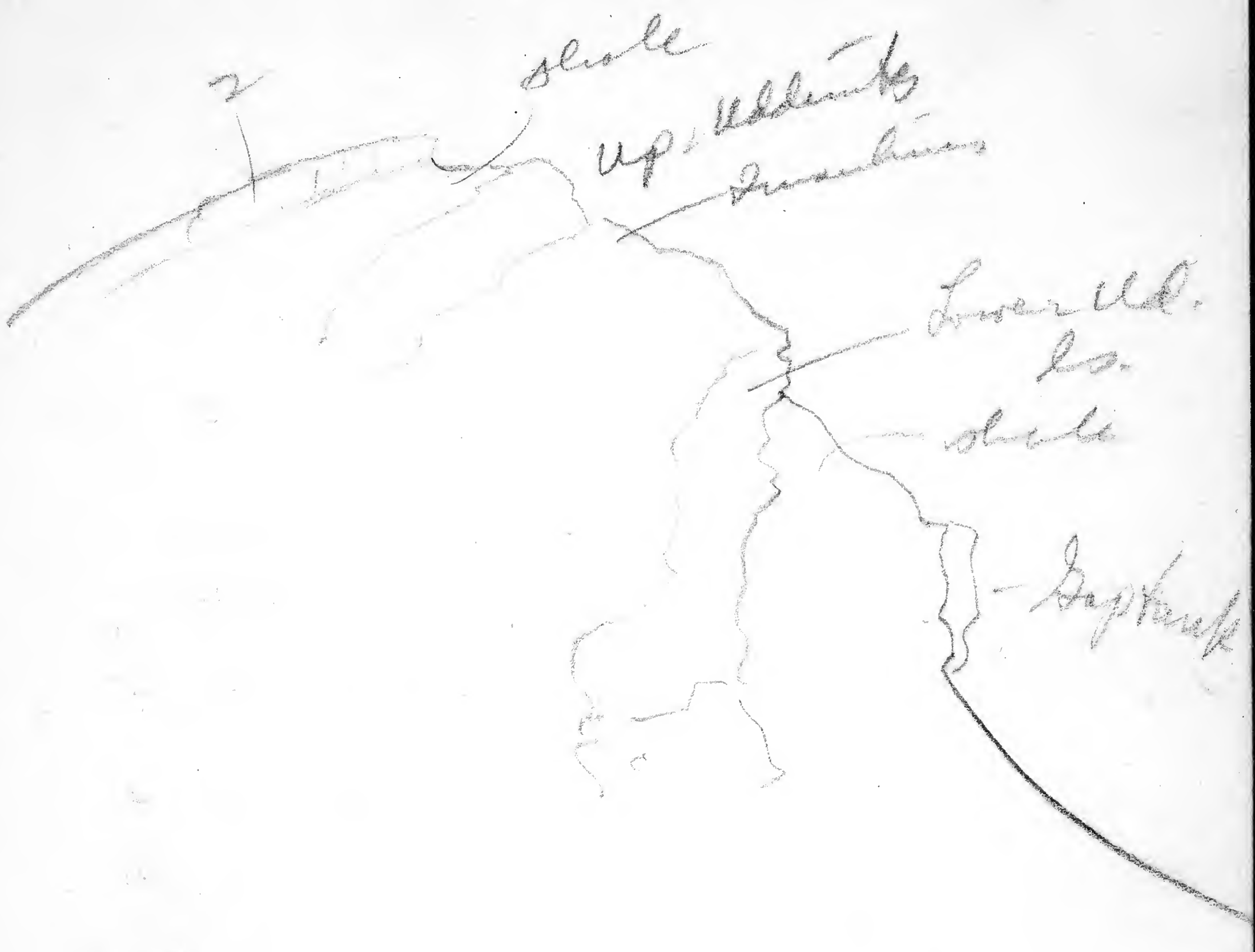
On nose of hill overlooking canyon in the bottom on top of bed 9 (WC9) occurs numerous Orthotetes & coarse-ribbed Meekella. This is same as the horizon of 7019.

Finished packing in afternoon

Wolfcamp Hills
July 4

Down dip slope of high crest to north branch of canyon #4 passes under main stream about 50 yards above mouth of canyon from S. #4 swings up hill between 2 canyon branches (South and forms N wall of ditch on slope of #2 where it plunges underground. #4 here contains Parafusulina and my loose specimen is probably from #4! Furthermore #4 becomes arenaceous on the north side of the hill and has considerable shale between it and the #2.

Lower Uddenites beds forms bottoms on & near the Gaptank ledge but are separated by shale to the east



Profile E from Seattle

41

Weights

3 feeds
5 blocks
2 " "
4 " "
6 " "
5 " "
4 " "
6 " "
10 " "
8 " "
5 " "
4 " "
4 " "
4 " "
6 " "
10 " "
1 " "

205
248
492
343
441
415
505
434
420
453
472
382
278
353
428
441
612
457
444
542
123

8564

584

9148

107
5 kegs
5 " "

8564
275
309

9148

105
9
119
38
81

42 East end Wolfcamp Hills

Lowest 15' covered for 10' but
7190 top 5' brown ribbon algae ls. At
21' is a brown thin bedded sandy ls
in thick plates of 2-3"
At 76' above the plain comes a
ledge of heavy bedded massive ls.
20' thick. Top at about 100' above plain.
This is marble-like ls. and I think
it is bed 2.
On the SE side of the hill the
upper Uddenites limestone thickens
enormously in the form of a great
gray and orange brown limestone
bioherms (masses). At this point its
base is about 100' above the plain and
its top about 30-40' below ls #2.
At one point it makes a small flat
below the #2 ledge. In this
bioherm occur numerous dark
patches about size of a nickel to a
half dollar. They may be ls pebbles
or algal patches. Much of the ls is
gray but weathers rusty orange yellow
Top of one bioherm is 100' above plain
This bed seems to be a continuation of the
upper Uddenites ls. The top of another
yellow is 50' higher with shale between
the lower ledge 10-15' thick. The
lower ledge descends to the
plain at about the SE corner
of the hills. The upper mass is
conglomeratic mottled yellow + gray
typically Wolfcampian in appearance
but very largely spread apart by
creep. I guess it at about 20' thick.
On point of hill at A about ~~20~~
120' above the plain are cobbly ls.

43 These partially belong to the Uddenites zone. The cobbles are fairly large

On the east side of the hill Run cobbly Co. rests on a 10' ledge of Wolfcamp type limestone and rubble. The slope below is covered with flat, yellow brown sandy clay and pebbles of dull brown limestone. The upper brown ledge about 50' above plain.

The upper brown bed is just below the 20' limestone at the crest of the hill I refer my section was first made. Here a brown bed has Orthoceras of large size

0198

Mountain Front
July 5

44

Sponge bed to Uddenites Knob N40°W
" " " High crest N61W

Sponge beds several independent masses at different levels. Over King's fossil bed comes a 2-3' bed of silicified algae.
Sponge bed 130' below crest of saddle on at 5520'

1/2 mi N of Hess Ranch cgl occupies lower half hill, Fusulines 15, 30' above cgl and 15' + 20' below top. Parenthelites 40' below top to top of cgl

David Jarvis

0199

(45.)

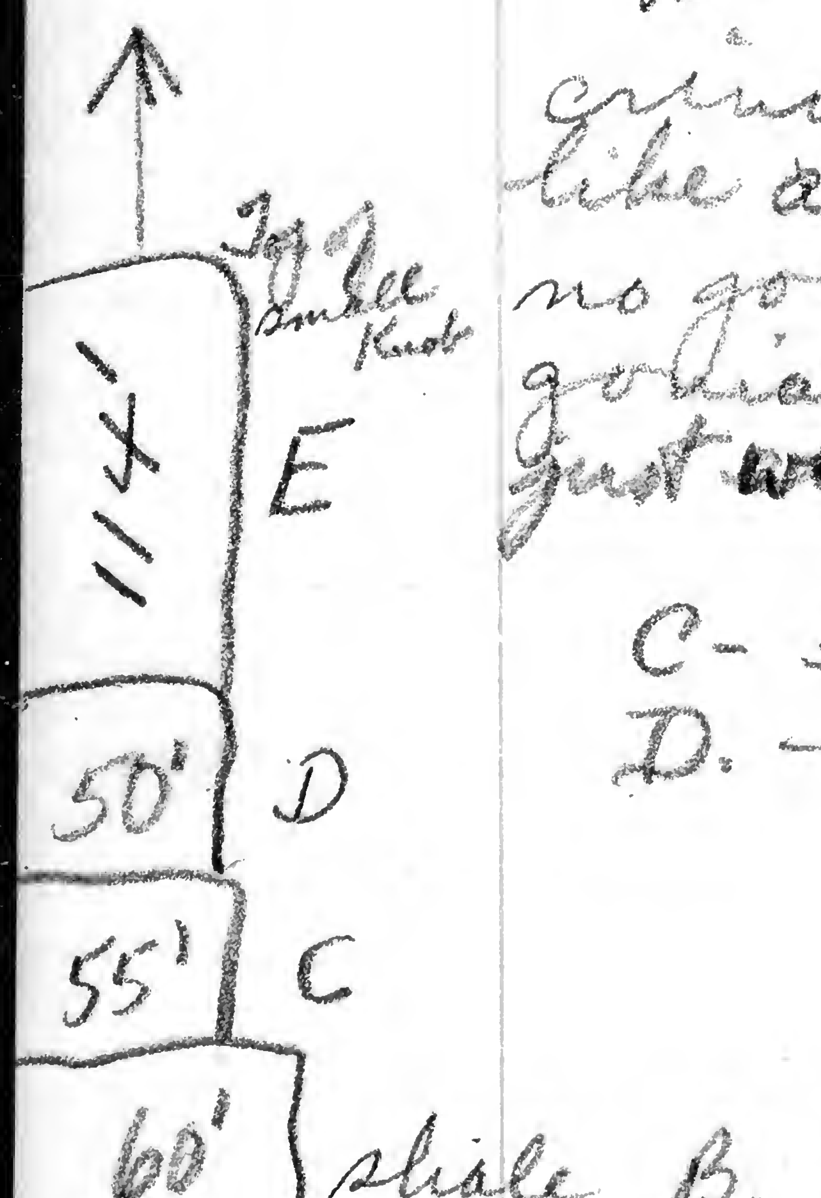
July 6

Leonard Mtn.

Tesnus-Wolfcamp contact in gully at about 4790'. Contact irregular and about 10-20' of coarse cgl. forms low hills on contact. At 4800' opposite (E) contact and in float on cgl. we found goniatites of Uddenites zone. These appear to be between the cgl. and the blk ls. To the west the cgl follows the 4780' contour to next ravine. The cgl. is a skin on top of an irregular Tesnus surface.

The small knob opposite Udd. is composed of cgl. Tesnus form the saddle between it and the main hill. The top of the cgl. is at about 4840' at base of main hill

B- 60' of slope covered. Saw loose crinoid stems, a ls piece with Uddenites-like algae. Some limonite float but no goniatites seen. Bill found a goniatite in slide from this shale just west of low knob with cgl.



C- 55' of non-conglomeratic, massive ls.
D.- 50' limestone cgl. massive

E- 38' up in E comes cobbly beds in calcarenite, algal beds & cobbles with numerous fossils, Leptodus, Scacchinella common. This horizon is at about 5043'. 81' higher comes top of hill at about 5124'. Top of small knob is dolomitized.

(46) The Uddenites shale is well exposed in a deep gully NE of the point where the goniatites were found. The shale is definitely over the lower cgl. which lies unconformably over the Lesnum. In the shale we found Aulosteges, Spiriferina and fusulines like the upper Uddenites zone. The shale seems to dip south at a low angle so that it rises toward the Mtn. Newell found goniatites in a low hill facing the gully in which we saw the contact. I suspect that this is the Uddenites shale passing under the Mtn. Such a dip would mean that any sections are measured up the dip and possibly are a little thick. Where Newell took his goniatites is the front of a low knob facing the arroyo and the wide place behind the 5000' contour possibly at 4950.

385
55
443

350
233
583
150
733

0746

1948
with ARL

702a — 1
702 un - 5
702 ent - 2
703 d — 3
703 c - 3
702 c — 3
ULWR - 6
702 b - 11
W4 — 4 Downfaulted block
check 706C - 16 Crinoid beds at base coal.
check 706B - 10+ = limestone #2, NE Hess Ranch.
Bore marked sponges comes from
Hess (West facies)
SP = Sullivan Peak
H.R = Hess Ranch